Volume I of III, pages Appx1-Appx1493 Nos. 2023-2124, 2023-2125

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

United Services Automobile Association,

Appellant,

v.

PNC BANK N.A.,

Appellee.

On Appeal from Decisions of the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR 2021-01073 and IPR 2021-01070

JOINT APPENDIX, VOLUME I OF III

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JOINT APPENDIX

	Filing Date	Filing Date IPR Docket		Document	Page No.
1.	01/19/2023	IPR2021- 01073	72	Final Written Decision	Appx1
2.	01/19/2023	IPR2021- 01070	68	Final Written Decision	Appx85
3.	03/29/2023	IPR2021- 01073	76	Decision on POP Request	Appx146
4.	03/29/2023	IPR2021- 01070	72	Decision on POP Request	Appx149
5.	04/28/2023	IPR2021- 01073	77	Decision on Request for Rehearing	Appx152
6.	04/28/2023	IPR2021- 01070	73	Decision on Request for Rehearing	Appx169
7.		IPR2021- 01073	Ex. 1001	U.S. Patent No. 8,977,571 to Bueche, Jr. et al. (the "'571 patent")	Appx182
8.		IPR2021- 01070	Ex. 1001	U.S. Patent No. 8,699,779 to Prasad et al. (the "'779 patent")	Appx211
9.		IPR2021- 01070, IPR2021- 01073	N/A	Docket IPR2021-01070 (PTO Certified List) Docket IPR2021-01073 (PTO Certified List)	Appx240

IPR2021-01073 PAPERS:

	Filing Date	Paper No.	Document	Page No.
10.	07/07/2021	3	IPR Petition	Appx441
11.	01/13/2022	19	Panel Change Order	Appx675
12.	01/24/2022	25	Institution Decision	Appx678
13.	05/02/2022	38	Patent Owner Response	Appx818
14.	06/01/2022	42	Corrected Patent Owner Response	Appx914
15.	08/08/2022	45	Petitioner's Reply to Patent Owner's Response	Appx1001

	Filing Date	Paper No.	Document	Page No.
16.	08/15/2022	46	Patent Owner's Objection to Evidence	Appx1039
17.	09/30/2022	60	Patent Owner's Sur-Reply	Appx1118
18.	11/28/2022	69	Transcript of October 25, 2022 Hearing	Appx1296
19.	06/30/2023	81	Notice of Appeal	Appx1488

IPR2021-01073 EXHIBITS:

	Filing Date	Exhibit No.	Document	Page No.
20.	07/07/2021	1002	Declaration of Todd Mowry	Appx1578
21.	07/07/2021	1003	U.S. Patent No. 8,768,836	Appx1738
22.	04/20/2022	1004	Corrected Chinese Patent Application Publication No. CN 1897644A with Certified Translation	Appx1753
23.	07/07/2021	1004	Chinese Patent Application Publication No. CN 1897644A with Certified Translation	Appx1785
24.	07/07/2021	1008	Maria Bruno-Britz, Mitek Launches Mobile Phone Check Capture Solution (Jan. 24, 2008)	Appx2614
25.	07/07/2021	1009	U.S. Patent No. 7,950,698	Appx2616
26.	07/07/2021	1014	FSTC Annual Conference (June 2008)	Appx2667
27.	07/07/2021	1015	U.S. Patent Application Publication No. 2006/0164682	Appx2713
28.	07/07/2021	1016	U.S. Patent Application Publication No. 2009/0185241	Appx2733
29.	07/07/2021	1023	P.R. 4-3 Joint Claim Construction and Prehearing Statement, No. 2:20-cv-319 (E.D. Tex. June 1, 2021)	Appx3138
30.	07/07/2021	1029	David Doermann et al., Progress in Camera-Based	Appx3295

	Filing Date	Exhibit	Document	Page No.
		No.		
			Document Image Analysis, IEEE (2003)	
31.	08/08/2022	1036	Supplemental Declaration of Todd Mowry	Appx3487
32.	08/08/2022	1037	Transcript of Deposition of Dr. Charles Creusere (July 25, 2022)	Appx3556
33.	08/08/2022	1046	Excerpts from Deposition of Dr. Charles Creusere (Jan. 8, 2022)	Appx3864
34.	08/08/2022	1047	Excerpts from Expert Report of Dr. Omid Kia (Nov. 24, 2021)	Appx3870
35.	08/08/2022	1048	U.S. Patent Application Pub. No. 2004/0247168	Appx3876
36.	08/08/2022	1049	U.S. Patent No. 5,359,667	Appx3889
37.	08/08/2022	1050	U.S. Patent No. 7,590,275	Appx3913
38.	08/30/2022	1056	Excerpts from Expert Report of Dr. Omid Kia (Nov. 24, 2021)	Appx4002
39.	10/28/2021	2003	Invalidity and Subject Matter Eligibility Contentions, No. 2:20-cv-319 (E.D. Tex. Mar. 3, 2021)	Appx4156
40.	10/28/2021	2005	Ravi Acharya, International Publication No. WO 01/61436 A2 (Aug. 23, 2001)	Appx4223
41.	10/28/2021	2008	Yoon, U.S. Patent Application No. US 2007/0262148 A1 (Nov. 15, 2007)	Appx4313
42.	10/28/2021	2010	Kunur Patel, How Mobile Technology Is Changing Banking's Future (Sept. 21, 2009)	Appx4416
43.	10/28/2021	2012	Nepomniachtchi et al., U.S. Patent No. 7,778,457 B2 (Aug. 17, 2010)	Appx4428
44.	12/10/2021	2016	Excerpts from Expert Report of Dr. Omid Kia (Nov. 24, 2021)	Appx4479

	Filing Date	Exhibit No.	Document	Page No.
45.	05/02/2022	2101	Final Written Decision, <i>Wells</i> Fargo Bank v. USAA, IPR2019- 01082	Appx4500
46.	05/02/2022	2115	Creusere Declaration	Appx5239
47.	05/02/2022	2116	Transcript of Dr. Todd Mowry Deposition (Apr. 29, 2022)	Appx5265
48.	05/02/2022	2120	Excerpt from Expert Report of Dr. Omid Kia (Nov. 24, 2021)	Appx5569
49.	08/23/2022	2124	Transcript of Trial, Nos. 2:20- cv-319, 2:21-cv-110 (E.D. Tex.)	Appx5842
50.	09/30/2022	2125	Deposition Transcript of Dr. Todd Mowry (Sept. 21, 2022)	Appx5863

IPR2021-01070 PAPERS:

	Filing Date	Paper No.	Document	Page No.
51.	07/07/2021	3	IPR Petition	Appx6125
52.	01/13/2022	19	Panel Change Order	Appx6347
53.	01/24/2022	25	Institution Decision	Appx6350
54.	05/02/2022	36	Patent Owner Response	Appx6478
55.	06/01/2022	40	Corrected Patent Owner Response	Appx6560
56.	08/08/2022	43	Petitioner's Reply to Patent Owner's Response	Appx6634
57.	09/30/2022	58	Patent Owner's Sur-Reply	Appx6734
58.	06/30/2023	76	Notice of Appeal	Appx7059

IPR2021-01070 EXHIBITS:

	Filing Date	Exhibit No.	Document	Page No.
59.	07/07/2021	1002	Declaration of Todd Mowry	Appx7126
60.	08/08/2022	1036	Supplemental Declaration of Todd Mowry	Appx8452
61.	08/08/2022	1037	Transcript of Deposition of Dr. Charles Creusere (July 25, 2022)	Appx8490

	Filing Date	Exhibit No.	Document	Page No.
62.	05/02/2022	2108	Final Written Decision, Wells Fargo Bank v. USAA, IPR2019-01083	Appx9686

Trials@uspto.gov 571-272-7822

Paper 72 Entered: January 19, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

IPR2021-01073 Patent 8,977,571 B1

Before MICHAEL R. ZECHER, DAVID C. McKONE, and SCOTT B. HOWARD, *Administrative Patent Judges*.

HOWARD, Administrative Patent Judge.

JUDGMENT

Final Written Decision
Determining All Challenged Claims Unpatentable
Denying Patent Owner's Motion to Exclude
Denying Patent Owner's Motion to File Supplemental Information
35 U.S.C. § 318(a), 37 C.F.R. §§ 42.64(c), 42.123(b)

IPR2021-01073 Patent 8,977,571 B1

I. INTRODUCTION

A. Background and Summary

PNC Bank, N.A. ("Petitioner"), filed a Petition requesting *inter partes* review ("IPR") of claims 1–6, 9, 10, 12, and 13 of U.S. Patent No. 8,977,571 B1 (Ex. 1001, "the '571 patent"). Paper 3 ("Petition," "Pet."). United Services Automobile Association ("Patent Owner") filed a Preliminary Response. Paper 8. With our authorization (Paper 10), Petitioner filed a Preliminary Reply to the Preliminary Response (Paper 12) and Patent Owner filed a Preliminary Sur-Reply (Paper 15). We instituted an *inter partes* review of claims 1–6, 9, 10, 12, and 13 of the '571 patent on all grounds of unpatentability alleged in the Petition. Paper 20 ("Institution Decision" or "Inst. Dec."). 4

After institution of trial, Patent Owner filed a Corrected Response (Paper 42, "PO Resp."), Petitioner filed a Reply (Paper 45, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 60, "PO Sur-reply").

With our authorization, Patent Owner filed a first motion to file supplemental information (Paper 47), which Petitioner opposed (Paper 49), and we granted (Paper 54).

Patent Owner filed a motion to exclude evidence (Paper 61, "Mot. Exclude"), Petitioner filed an opposition (Paper 63, "Opp. Exclude"), and Patent Owner filed a reply to the opposition (Paper 65, "Reply Exclude").

¹ A public version of the Preliminary Response is filed as Paper 9.

² A public version of the Preliminary Reply is filed as Paper 14.

³ A public version of the Preliminary Sur-reply is filed as Paper 18.

⁴ A public version of the Institution Decision is filed as Paper 25.

IPR2021-01073 Patent 8,977,571 B1

An oral hearing⁵ was held on October 25, 2022, and the record contains a transcript of this hearing. Paper 69 ("Tr.").

With our authorization (Ex. 3003), Patent Owner filed a second motion to file supplemental information (Paper 70, "Mot. SI"), which Petitioner opposes (Paper 71, "Opp. SI").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–6, 9, 10, 12, and 13 of the '571 patent are unpatentable.

B. Real Parties in Interest

Petitioner identifies itself as the only real party in interest. Pet. 3; see also Inst. Dec. 35–41 (holding that Mitek Systems, Inc., was not an unnamed real party in interest).

Patent Owner identifies itself as the only real party in interest. Paper 5 (Patent Owner's Mandatory Notices), 2.

C. Related Matters

The parties identify *United Services Automobile Association v. PNC Bank N.A.*, No. 2:20-cv-00319-JRG(E.D. Tex.) ("the Texas case" or "the Texas court") as a litigation in which Patent Owner is asserting, *inter alia*, the '571 patent. Pet. 3; Paper 5, 2. Patent Owner also identifies *Mitek Systems, Inc. v. United Services Automobile Association*, Case No. 2:20-cv-00115-JRG (E.D. Tex.) as a proceeding involving the '571 patent. Paper 5, 2.

⁵ A single consolidated oral hearing was held for IPR2021-01070 and IPR2021-01073. *See* Tr. 1, 3:2–11.

IPR2021-01073 Patent 8,977,571 B1

The parties also identify various post-grant proceedings involving the '571 patent and other related patents. Pet. 3–4; Paper 5, 3. This includes (1) Wells Fargo Bank, N.A. v. United Services Automobile Ass'n, CBM2019-00004 (institution denied because the '779 patent is not a covered business method patent), (2) Wells Fargo Bank, N.A. v. United Services Automobile Ass'n, IPR2019-01082 ("Wells Fargo IPR") (final written decision determining no challenged claims unpatentable), and (3) Mitek Systems, Inc. v. United Services Automobile Ass'n, IPR2020-00975 (institution denied). See Paper 5, 3; Pet. 3–4.

D. The '571 Patent

The '571 patent is titled "Systems and Methods for Image Monitoring of Check During Mobile Deposit." Ex. 1001, code (54). Figure 1 of the '571 patent is reproduced below.

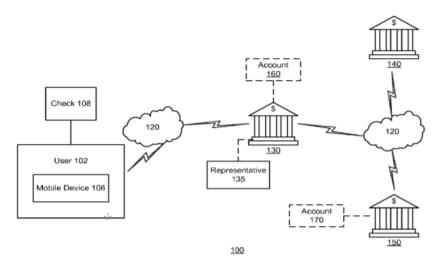


Figure 1 above illustrates a system "in which example embodiments and aspects may be implemented." *Id.* at 2:43–45. As shown in Figure 1, system 100 includes an account owner (user 102) and financial institutions 130, 140, 150 (e.g., banks), communicating with each other via networks 120 (e.g., the Internet). *Id.* at 2:45–52, 3:4–22. User 102 may deposit check 108 in account 160, and financial institution 130 may process and clear

IPR2021-01073 Patent 8,977,571 B1

check 108. *Id.* at 3:10–12. For example, after endorsing check 108, user 102 uses mobile device 106 that includes a camera to convert check 108 into a digital image by taking a picture of the front and/or back of check 108. *Id.* at 3:45–48.

The '571 patent recognizes that "depositing a check typically involves [a payee] going to a local bank branch and physically presenting the check to a bank teller." Ex. 1001, 1:22–24. Thus, "[t]o reduce such burdens for the payee, systems and methods have been developed to enable the remote deposit of checks." *Id.* at 1:24–26. The '571 patent states:

For example, the payee may capture a digital image of a check using a mobile device. The financial institution may then receive from the payee the digital image of the check. The financial institution may then use the digital image to credit funds to the payee.

Id. at 1:26–30. However, the '571 patent recognizes that "such a technique requires the efficient and accurate detection and extraction of the information pertaining to a check in the digital image," and that "[c]apturing a digital image at a mobile device that allows for subsequent detection and extraction of the information from the digital image is difficult." Id. at 1:30–35. In addition, the '571 patent recites that electronically exchanging a check image requires the image to be in "Check 21 compliant format." Id. at 12:16–17. The '571 patent explains that:

The Check Clearing for the 21st Century Act (or Check 21 Act) is a United States federal law that allows the recipient of a paper check to create a digital version, thereby eliminating the need for further handling of the physical document. The Check 21 standard for electronic exchange is defined in the standard DSTU X9.37-2003 ("X9.37"). It is a binary interchange format.

Id. at 12:19–25. The 571 patent discloses an invention wherein:

IPR2021-01073 Patent 8,977,571 B1

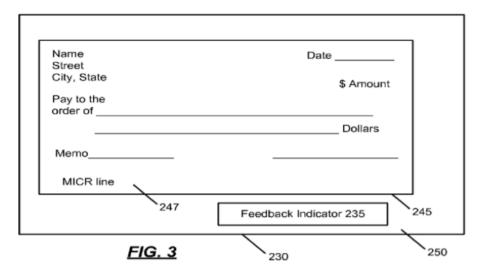
An image of a check that is in the field of view of a camera is monitored prior to the image of the check being captured. The camera is associated with a mobile device. The monitoring may be performed by the camera, the mobile device, and/or a financial institution that is in communication with the mobile device. When the image of the check in the field of view passes monitoring criteria, an image may be taken by the camera and provided from the mobile device to a financial institution. The check may be deposited in a user's bank account based on the image.

Id. at 1:38–47 (emphases added).

The '571 patent explains that "[t]o increase the likelihood of capturing a digital image of the check 108 that may be readable and processed such that the check 108 can be cleared, the image is monitored for compliance with one or more monitoring criteria, prior to the image of the check 108 being captured." Ex. 1001, 3:54–58 (emphasis added). The '571 patent further states that "[a]n application may monitor whether the check 108 is sufficiently within the frame of the camera and has a high enough quality for subsequent processing." Id. at 3:61–64 (emphases added); see also id. at 4:17–22 ("By ensuring that the image of the check passes monitoring criteria during pre-image capture monitoring, the number of nonconforming images of checks is reduced during presentment of the images to a financial institution for processing and clearing." (Emphasis added)); 7:52–57; 8:45–49; 10:6–13; 12:9–14; 13:38–40 ("Compliance with the monitoring criteria is intended to ensure that the image of the check is suitable for one or more processing tasks.").

IPR2021-01073 Patent 8,977,571 B1

Figure 3 of the '571 patent is reproduced below.



As shown in Figure 3 above, image 230 comprises check image 247, background image 250, feedback indicator 235, and edge 245, which separates check image 247 from background image 250. Ex. 1001, 6:63–7:2. Image 230 may be generated by a mobile device with a camera and provided in the field of view of the camera prior to and during image capture of the check. *Id.* at 6:65–67, 7:3–5.

According to the '571 patent, one of the monitoring criteria may be based on the positioning of check 108 in image 230. Ex. 1001, 7:29–30. The positioning of check 108 in image 230 may be compared with an alignment guide. *Id.* at 7:38–41. The alignment guide may be a bounding rectangle, horizontal and/or vertical bars, or parallel lines. *Id.* at 7:59–62. For example, "aligning the check 108, thereby passing this monitoring criterion, means enclosing the check 108 within the bounding rectangle." *Id.* at 7:62–65. If check 108 is outside the alignment guide in image 230, feedback is generated and provided to user 102 regarding this monitoring criterion with instruction for moving check 108 or the camera in order to align check 108 properly in the field of view. *Id.* at 7:65–8:3.

IPR2021-01073 Patent 8,977,571 B1

The '571 patent also discloses that, "[i]n an implementation, the results of the monitoring may indicate that the camera and/or the check should be repositioned and/or the light source should be adjusted prior to an image capture in order to capture an image of the check that may be processed properly, e.g., to have the data from the check obtained without error from the image, so that that check can be cleared." Id. at 15:43–49 (emphasis added). The '571 patent explains that "feedback based on the results may be generated and provided visually and/or aurally to the user via the camera and/or the mobile device" and that "the feedback may be provided if the image fails to pass the monitoring criteria." Id. at 15:50–53.

E. Illustrative Claims

Of the challenged claims, claims 1 and 9 are independent. Claims 2–6 depend from claim 1, and claims 10, 12, and 13 depend from claim 9. Claim 1 is illustrative and reproduced below:

- 1. [1-pre] A non-transitory computer-readable medium comprising computer-readable instructions for depositing a check that, when executed by a processor, cause the processor to:
- [1a] monitor an image of the check in a field of view of a camera of a mobile device with respect to a monitoring criterion using an image monitoring and capture module of the mobile device;
- [1b] capture the image of the check with the camera when the image of the check passes the monitoring criterion; and
- [1c] provide the image of the check from the camera to a depository via a communication pathway between the mobile device and the depository.

Ex. 1001, 21:5–17.

IPR2021-01073 Patent 8,977,571 B1

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–6, 9, 10, 12, and 13 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. § ⁶	Reference(s)/Basis
1–3, 6, 9, 10, 13	103(a)	Acharya, ⁷ Luo ⁸
4, 5	103(a)	Acharya, Luo, Nepomniachtchi ⁹
12	103(a)	Acharya, Luo, Yoon ¹⁰

Petitioner also relies on the testimony of Dr. Todd Mowry. Ex. 1002; Ex. 1036.

Patent Owner cites extensively to the references listed below (*see*, *e.g.*, PO Resp. 6–27):

Re	eference	Date	Exhibit No.
Yoon	US 2007/0262148 A1	pub. Nov. 15, 2007	2008
ImageNet	Presentation titled "ImageNet Mobile Deposit" by Mitek Systems	June 2008	1014
Blackson	US 7,419,093 B1	iss. Sept. 2, 2008	2108

⁶ The Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. § 103. The application that issued as the '571 patent has a filing date prior to the effective date of the applicable AIA amendments (March 16, 2013). *See* Ex. 1001, code (22). Accordingly, we apply the pre-AIA version of 35 U.S.C. § 103.

⁷ US 8,768,836 B1, issued on July 1, 2014 (Ex. 1003).

⁸ CN 1897644A, published Jan. 17, 2007 (Ex. 1004). Exhibit 1004 consists of both original published Chinese patent application and an English translation. All cites are to the pagination added by Petitioner to the English translation.

⁹ US 2009/0185241 A1, published July 23, 2009 (Ex. 1016).

¹⁰ US 2007/0262148 A1, published Nov. 15, 2007 (Ex. 1005).

IPR2021-01073 Patent 8,977,571 B1

Patent Owner also relies on the testimony of Dr. Charles Creusere. Ex. 2115.

II. ANALYSIS

A. Legal Standards

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness under 35 U.S.C. § 103(a) that requires consideration of four factors: (1) the "level of ordinary skill in the pertinent art," (2) the "scope and content of the prior art," (3) the "differences between the prior art and the claims at issue," and (4) if in evidence, "secondary considerations" of non-obviousness such as "commercial success, long-felt but unsolved needs, failure of others, etc." *Id.* at 17–18. "While the sequence of these questions might be reordered in any particular case," *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007), the U.S. Court of Appeals for the Federal Circuit has repeatedly emphasized that "it is error to reach a conclusion of obviousness until all those factors are considered," *WBIP*, *LLC v. Kohler*, 829 F.3d 1317, 1328 (Fed. Cir. 2016). ¹¹

B. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. "The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry." *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). The "person having

¹¹ Because neither party address objective evidence of non-obviousness, we focus solely on the first three *Graham* factors.

IPR2021-01073 Patent 8,977,571 B1

ordinary skill in the art" is a hypothetical construct, from whose vantage point obviousness is assessed. *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

Factors pertinent to a determination of the level of ordinary skill in the art include "(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." *Env't Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696–97 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). "Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case." *Id.*

Petitioner argues that a person having ordinary skill in the art "would have had a bachelor's degree in electrical engineering, computer science, computer engineering, or equivalent field, and at least two years of prior experience with image processing or scanning technology involving transferring and processing of image data to and at a server." Pet. 20 (citing Ex. 1002 ¶ 41). Petitioner further argues that "[a] person with additional education or additional industrial experience could still be of ordinary skill in the art if that additional aspect compensates for a deficit in one of the other aspects of the requirements stated above." *Id.* at 20–21 (citing Ex. 1002 ¶ 41).

Patent Owner did not address the level of skill in its Response. *See* PO Resp.

We are persuaded that Petitioner's proposal is consistent with the problems and solutions in the '571 patent and prior art of record.

IPR2021-01073 Patent 8,977,571 B1

Accordingly, we adopt Petitioner's proposed formulation of the level of ordinary skill in the art.

C. Claim Construction

We apply the same claim construction standard used in the federal courts, in other words, the claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b) (2021). Under the *Phillips* standard, the "words of a claim 'are generally given their ordinary and customary meaning," which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips*, 415 F.3d at 1312–13.

Petitioner proposes the construction of various terms. Pet. 21–25. For all of the terms except for "feedback... regarding the image of the check with respect to the monitoring criterion" as recited in dependent claim 2, Petitioner proposes using "the constructions urged by [Patent Owner] in the co-pending district court litigation or as the parties agreed." *Id.* For the "feedback" limitation, Petitioner argues that no further construction is necessary. *Id.* at 24–25.

Patent Owner argues that, "[w]ith the exception of 'image monitoring and capture module,' the district court has since adopted each of these constructions (EX1034, 12–13, 40–56) and the Board should apply the same constructions in this proceeding." PO Resp. 27. With regard to the "imaging monitoring and capture module," recited in claims 1 and 9, Patent Owner requests that we adopt the Texas court's claim construction. *Id.* at 28–29.

IPR2021-01073 Patent 8,977,571 B1

We discuss the construction of "image monitoring and capturing module" below. For all other terms, because no express construction is needed for our decision, we do not construe them. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

1. The Parties' Arguments

Patent Owner argues that we should adopt the Texas court's claim construction: that the limitation is subject to 35 U.S.C. § 112, ¶ 6 with a claimed function of "image monitoring and capture" and a corresponding structure of "image monitoring and capture module 456 as set forth in the specification; and equivalents thereof." PO Resp. 28 (quoting Ex. 1034, 65 (The Texas Case: Claim Construction Memorandum Opinion And Order)). More specifically, Patent Owner argues that the corresponding structure described in the specification "includes a digital camera, a mobile device operating system that can access live video frames from the camera via APIs [application programing interfaces], and software that can monitor these frames." Id. at 31–32 (citing Ex. 1001, 12:55–13:3 (the camera), 5:45–50 (video frames), 12:65–67 (image capture activated by a software call), 11:6– 17 (operates through a software abstraction layer), 11:22–30 (software causes analyzing the image and/or capturing the image)); see also PO Surreply 5–6 (discussing the video frame requirement), 7 (discussing software). Patent Owner further argues that the software resides on the mobile device, as opposed to the camera. PO Sur-reply 4 (citing Ex. 2107, 25 (The Texas Case: Petitioner's Opening Claim Construction Brief)).

IPR2021-01073 Patent 8,977,571 B1

According to the Texas court (Ex. 1034, 64–65), the specification states that "the image monitoring and capture module 456 may include the camera 207 contained within the mobile device 106. Alternately, the camera 207 may be detachably coupled to the mobile device 106 such as through a secure digital (SD) slot or over any Suitable communications bus, such as USB (universal serial bus)." Ex. 1001, 13:1-6 (emphasis added). The specification also states that "[t]he check processing module 454 may be configured, in one example, to cause the image monitoring and capture module 456 to monitor an image of at least one side of a check provided in a field of view of the camera 207 and then capture the image after it passes monitoring criteria." Id. at 13:34–38 (emphasis added). According to the specification, "[i]n an implementation, the system may instruct a camera associated with the mobile device to monitor and capture an image of the negotiable instrument in conjunction with monitoring criteria." *Id.* at 15:30– 33 (emphasis added). Based on the aforementioned citations relied on by the Texas court, Patent Owner argues that the corresponding structure identified by the transitional term "may" can be the structure that defines the module. PO Sur-reply 2–4 (citing Ex. 1034, 64).

Petitioner argues that the term "image monitoring and capture module" is not governed by section 112, paragraph 6 and that "[n]o further construction is necessary." Pet. 23; see also Pet. Reply 13–14 (arguing that Patent Owner has consistently argued that the limitation should be given its plain and ordinary meaning in all prior proceedings).

Petitioner also argues that the only structure identified by the Texas court was "image monitoring and capture module 456 as set forth in the specification; and equivalents thereof." Pet. Reply 14–15 (quoting Ex. 1034, 65). According to Petitioner, "[u]nder the [Texas] court's construction, the

IPR2021-01073 Patent 8,977,571 B1

corresponding structure requires nothing more than a **camera** (which may be positioned within a **mobile device** as in Acharya/Luo) and related **software**." *Id*. at 15 (citing PO Resp. 64–65). 12

Petitioner also argues that Patent Owner "seeks to add structural requirements that the district court never suggested, much less ordered." Pet. Reply 16. First, Petitioner argues that video frames are merely "an implementation" and that "[e]mbodiments of the image monitoring and capture module do not require production or monitoring of video frames at all." *Id.* at 17 (quoting Ex. 1001, 5:45–61, 13:7–10). Petitioner further argues that in the Texas case, Patent Owner argues that only a single frame is required. *Id.* (citing Ex. 1039 (The Texas Case: *Markman* Hearing Transcript), 37:18–23, 38:21–39:7; Ex. 1036 ¶¶ 46–48).

Second, Petitioner argues that if the software abstraction layer is required, it is only an alternate embodiment. Pet. Reply 18 (citing Ex. 1001, 11:6–8).

- 2. Our Analysis
 - a) The Texas Court's Construction

Our rules state that "any prior claim construction determination concerning a term of the claim in a civil action, or a proceeding before the International Trade Commission, that is timely made of record in the *inter partes* review proceeding will be considered." 37 C.F.R. § 42.100(b). Accordingly, we begin our analysis by considering what the Texas court held. *See* Ex. 1034, 60–65 (relevant claim construction and analysis).

The Texas court determined that "the phrase 'image monitoring and capture' that precedes the word 'module' has not been shown to connote

¹² Unless indicated, all bold emphasis is in the original.

IPR2021-01073 Patent 8,977,571 B1

structure and instead recites function." Ex. 1034, 62. According to the Texas court, "[r]ead in the context of the claim as a whole (reproduced above), the term 'image monitoring and capture module' is tantamount to a recital of a 'module for image monitoring and capture' under the circumstances of the present case." *Id.* Thus, according to the Texas court, "the term 'image monitoring and capture module' does not connote sufficient structure to avoid means-plus-function treatment, and [Petitioner] has rebutted the presumption against means-plus-function treatment for this non-means term." *Id.* at 64.

The Texas court also rejected Petitioner's argument that the specification lacked sufficient corresponding structure. Ex. 1034, 64–65. Instead, the Texas court pointed to the following language from the specification as denoting sufficient structure:

The client apparatus 450 may include one or more software objects operating on a mobile device 106, such as described above. The client apparatus 450 may include a communications module 452, a check processing module 454, and an image monitoring and capture module 456. The client apparatus 450 may receive, in one example, one or more check images 458 as an input and output one or more processed images 460.

In an implementation, the check images 458 may be received following a software call from the check processing module 454 to the image monitoring and capture module 456. In such an implementation, the image monitoring and capture module 456 may include the camera 207 contained within the mobile device 106. Alternately, the camera 207 may be detachably coupled to the mobile device 106

. . . .

* * *

The check processing module 454 may be configured, in one example, to cause the image monitoring and capture module 456

IPR2021-01073 Patent 8,977,571 B1

to monitor an image of at least one side of a check provided in a field of view of the camera 207 and then capture the image after it passes monitoring criteria.

Id. (quoting Ex. 1001, 12:55–13:6, 13:35–38) (citing Ex. 1001, 15:30–33) ("The system may instruct a camera associated with the mobile device to monitor and capture an image of the negotiable instrument in conjunction with monitoring criteria.")). Based on the above, the Texas court determined that "'image monitoring and capture module' is a means-plusfunction term governed by 35 U.S.C. § 112, ¶ 6, the claimed function is 'image monitoring and capture,' and the corresponding structure is 'image monitoring and capture module 456 as set forth in the specification; and equivalents thereof." Id. at 65.

b) Our Claim Construction

"An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." 35 U.S.C. § 112, ¶ 6 (2018). A claim term that lacks the word "means" triggers a rebuttable presumption that 35 U.S.C. § 112, sixth paragraph, does not apply. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348–49 (Fed. Cir. 2015) (en banc). That presumption can be overcome, however, if it is shown "that the claim term fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function." *Id.* at 1349 (quoting *Watts v. XL Sys., Inc.*, 232 F.3d 877, 880 (Fed. Cir. 2000)). "The standard is whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name

IPR2021-01073 Patent 8,977,571 B1

for structure." *Id.* (citing *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996)). "To determine whether the claim limitation at issue connotes sufficiently definite structure to a person of ordinary skill in the art, we look first to intrinsic evidence, and then, if necessary, to the extrinsic evidence." *TEK Glob., S.R.L. v. Sealant Sys. Int'l, Inc.*, 920 F.3d 777, 785 (Fed. Cir. 2019).

Petitioner has not directed us to sufficient evidence that "image monitoring and capture module" denotes structure. Although Dr. Mowry states that "the Board was correct to construe 'image monitoring and capture module' according to its plain meaning instead of the district court's meansplus-function construction when it instituted this IPR," his opinion is conclusory without any supporting analysis. See Ex. 1036 ¶ 42.

Accordingly, we give it no weight on this point. See 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

Instead, we are guided by the Federal Circuit, which held that ""[m]odule' is a well-known nonce word that can operate as a substitute for 'means' in the context of § 112, para. 6." *Williamson*, 792 F.3d at 1350. Such a generic description of software "may be used in a claim in a manner that is tantamount to using the word 'means' because they 'typically do not connote sufficiently definite structure' and therefore may invoke § 112, para. 6." *Id.* (quoting *Mass. Inst. of Tech. & Elecs. for Imaging, Inc. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006) (citing Manual of Patent Examining Procedure § 2181)). In this proceeding, the term "module" does not provide any indication of structure and is the equivalent of using the term means.

IPR2021-01073 Patent 8,977,571 B1

Nor is there sufficient evidence in the record that the prefix "image monitoring and capture" denotes any structure. Instead, as the Texas court held, those words do no more than denote the function performed by the generic module. *See* Ex. 1034, 62. Nor has Petitioner identified anything in the specification or prosecution history of the '571 patent that might lead us to construe that expression as the name of a sufficiently definite structure so as to take the overall claim limitation out of the ambit of § 112, para. 6. *See* Pet. Reply. That is, the presence of these particular terms does not provide any structural significance to the term "module" in this case.

Accordingly, we conclude that (1) words "image monitoring and capture module" recited in claims 1 and 9 fails to recite sufficiently definite structure, (2) the presumption against means-plus-function claiming is rebutted, and (3) as the Texas court concluded, this limitation is subject to the provisions of 35 U.S.C. § 112, para. 6. See Ex. 1034, 61–65.

"Construing a means-plus-function claim term is a two-step process. The court must first identify the claimed function. . . . Then, the court must determine what structure, if any, disclosed in the specification corresponds to the claimed function." *Williamson*, 792 F.3d at 1351–52 (citing *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1311 (Fed. Cir. 2012)). "Structure disclosed in the specification qualifies as 'corresponding structure' if the intrinsic evidence clearly links or associates that structure to the function recited in the claim." *Id.* at 1352 (citing *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997)).

As discussed above, image monitoring and capture is the function recited in the claims. *See*, *e.g.*, Ex. 1001, 15:30–33 ("[T]he system may instruct a camera associated with the mobile device to monitor and capture

IPR2021-01073 Patent 8,977,571 B1

an image of the negotiable instrument in conjunction with monitoring criteria.").

With regard to the structure, we agree with the Texas court's identification of structure. *See* Ex. 1034, 64. That is, the specification links the image capture and monitoring to a software object:

The client apparatus 450 may include one or more software objects operating on a mobile device 106, such as described above. The client apparatus 450 may include a communications module 452, a check processing module 454, and an image monitoring and capture module 456. The client apparatus 450 may receive, in one example, one or more check images 458 as an input and output one or more processed images 460.

Ex. 1001, 12:57–64 (emphases added) (cited by Ex. 1034, 64). The specification also links a camera, which may be contained within the mobile device or detached:

In an implementation, the check images 458 may be received following a software call from the check processing module 454 to the image monitoring and capture module 456. In such an implementation, the image monitoring and capture module 456 may include the camera 207 contained within the mobile device 106. Alternately, the camera 207 may be detachably coupled to the mobile device 106....

. . .

The check processing module 454 may be configured, in one example, to cause the *image monitoring and capture module* 456 to monitor an image of at least one side of a check provided in a field of view of the camera 207 and then capture the image after it passes monitoring criteria. . . .

. . . .

... [T]he system may instruct a camera associated with the mobile device to monitor and capture an image of the negotiable instrument in conjunction with monitoring criteria.

IPR2021-01073 Patent 8,977,571 B1

Ex. 1001, 12:65–13:4, 13:35–38, 15:30–38 (cited by Ex. 1034, 64–65) (emphases added). In each of those sections of the specification, the function of "image capture and monitoring" is explicitly linked to structure. *See* Pet. Reply 15 (identifying the camera and software as linked structure); PO Resp. 28 (arguing that "[t]he Board should apply the district court's construction in this proceeding."). ¹³

Besides the structure identified above, the parties have identified additional structure; however, as we discuss below, those structures are not linked to the recited and claimed function. First, Petitioner argues that the corresponding structure includes the mobile device. Pet. Reply 15. We disagree. Although the sections of the specification quoted above refers to the mobile device, there is nothing in the quoted sections that link the mobile device to the claimed function. To the contrary, the specification is agnostic as to whether the imaging and capture module is part of the mobile device. Specifically, the specification states that that the camera—which is clearly linked to the image monitoring and capture function—may be either "within the mobile device 106" or "detachably coupled to the mobile device." Ex. 1001, 12:65–13:4.

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[&]quot;If the patentee fails to disclose adequate corresponding structure, the claim is indefinite." *Williamson*, 792 F.3d at 1352 (citing *Noah*, 675 F.3d at 1311–12). Nevertheless, because we are limited to determining patentability based only on 35 U.S.C. §§ 102 and 103, we do not consider whether the specification discloses adequate corresponding structure such that the claim term "image monitoring and capture module" is definite. *See* 35 U.S.C. § 311(b) ("A petitioner in an inter partes review may request to cancel as unpatentable 1 or more claims only on a ground that could be raised under section 102 and 103 and only on the basis of prior art consisting of patents or printed publications.").

IPR2021-01073 Patent 8,977,571 B1

Second, we disagree with Patent Owner that the camera must produce video frames. *See* PO Resp. 32 (Ex. 1001, 54–50). Although the specification describes how "[a] frame of video may be obtained and monitored," the specification does not describe how the monitoring or capturing is performed or link the video frame to the claimed function. *See* Ex. 1001, 5:45–50. Moreover, there is nothing in the Texas court's claim construction, which Patent Owner said we should adopt, indicating that the camera must produce a video frame. *See* Ex. 1034, 64–65. Instead, the portion of the specification cited by the Texas court simply requires a camera. *Id*.

Third, we disagree with Patent Owner that structure of the image monitoring and capture module requires a software call from a check processing module. *See* PO Resp. 32 (citing Ex. 1001, 12:65–67). There is nothing in the sentence cited by Patent Owner linking that software call to the function of image monitoring and capture; instead, the sentence simply describes what starts the process of image monitoring and capture. Ex. 1001, 12:65–67.

Fourth, we do not agree with Patent Owner that the image monitoring and capture module must use a software abstraction layer. PO Resp. 32 (citing Ex. 1001, 11:6–17). There is nothing in the cited specification that links that software abstraction layer to the claimed function. *See* Ex. 1001, 11:6–17. Moreover, the specification lists the software abstraction layer as an alternate design and gives other examples, such as a wholly self-contained application sent to the client or software previous downloaded on the client. *See* Ex. 1001, 10:48–11:8. Thus, to the extent that a software abstraction layer is linked to the function—which it is not—so are the other recited software examples.

IPR2021-01073 Patent 8,977,571 B1

Fifth, we do not agree that the camera must perform the image monitoring and capture function. See PO Resp. 32 (citing Ex. 1001, 11:22– 30). Although the section of the specification cited by Patent Owner states how the software object "may" function—"caus[ing] the camera 207 to analyze an image in the field of view with respect to monitoring criteria, provide feedback, and/or take a picture or capture one or more images of the check 108 being deposited"—we do not see the specification as a whole requiring the camera to perform the image monitoring and capturing function. See Ex. 1001, 11:20–30. As the section of the specification cited by the Texas court makes clear, the image monitoring and capture module "may include the camera 207." Ex. 1001, 13:1–6 (cited by Ex. 1034, 64). But "may include the camera" implies that the module may not include the camera. That interpretation is also consistent with the language of claim 1, which separately recites the camera and the image monitoring and capture module as different components. Ex. 1001, 21:6–17. Thus, the language of the claim and the specification as a whole is inconsistent with requiring the camera to execute the image monitoring and capture software.

D. Obviousness over Acharya and Luo

Petitioner argues that claims 1–3, 6, 9, 10, and 13 would have been obvious over Acharya and Luo. *See* Pet. 33–73. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that these claims are unpatentable.

1. Acharya

Acharya "relates generally to a system and method for initiating a deposit transaction, where the depositor is a banking customer located at a remote location, where the item is to be deposited without physical transport of the item to a bank and where the item to be deposited is a financial

IPR2021-01073 Patent 8,977,571 B1

instrument, e.g. a paper check, from a third party (i.e., other than the bank customer or the paying bank), payable to the depositor, where the banking customer has or creates a digital image of the financial instrument." Ex. 1003, 1:18–26.

Figure 1, not reproduced, depicts a schematic diagram of a system for depositing financial instruments. Ex. 1003, 3:62–63, 4:9–15. Figure 1 shows that Remote Customer Terminal (RCT) 100 is connected to Bank of First Deposit (BOFD) system 110. *Id.* at 4:14–17. RCT 100 can be a telephone, digital camera, fax machine, automated teller machine (ATM), cell phone, personal digital assistant (PDA), or other device, and includes input devices 101, output devices 102, central processing unit (CPU) 103, and memory 104. *Id.* at 4:18–22, 4:32–34. RCT 100 communicates with BOFD system 110 via communication link 120, which can be, e.g., a dedicated line or the Internet. *Id.* at 5:53–58. BOFD system 110 is connected to check clearing systems 130 via communication link 140. *Id.* at 6:32–36.

A method of depositing financial instruments in the context of the system of Figure 1 is depicted in Figure 2, not reproduced, which is a flow diagram illustrating the flow of information from the perspective of a banking customer. Ex. 1003, 3:64–65, 6:52–54. The banking customer may first prepare a digital image of a financial instrument (e.g., a check) using a digital camera and store the image in memory 104. *Id.* at 7:14–22. The banking customer may additionally access software that can recognize data in the digital image and store that in memory 104 along with the digital image. *Id.* at 7:23–30; *see also id.* at 4:65–5:6 ("For example, optical character recognition software may be used in conjunction with the [Digital Image Scanner (DIS)] or the digital camera to convert machine printed

IPR2021-01073 Patent 8,977,571 B1

characters on the financial instrument or the digital image of the financial instrument to electronic text. Likewise, intelligent character recognition software may be used to convert handwritten characters on the financial instrument or on the digital image of the financial instrument to electronic text."). "In another embodiment, in addition or alternatively, the banking customer may enter data into the RCT memory 104 using RCT input devices 101 such as the keypad, keyboard or microphone for storage." *Id.* at 7:30–33. "Data may comprise customer identification, customer account number, name of payor, name and routing number of payor's bank, the amount of the financial instrument, an image of the financial instrument, along with other information." *Id.* at 7:37–41.

To deposit the check, the banking customer logs on to BOFD system 110 from RCT 100, selects a "deposit" option from a menu of transaction options, and is prompted to deposit a financial instrument. *Id.* at 6:55–7:7 (steps 200–230). In response to a prompt for additional information (step 240), "the banking customer may submit the data taken from the financial instrument, along with the digital image of the financial instrument, to the BOFD system 110 for processing 250, and may receive acknowledgement from the BOFD system 110 that the transaction is being processed 260." *Id.* at 7:42–47. The banking customer may then receive a response indicating immediate provisional credit for the deposit (step 270). *Id.* at 8:4–8.

2. *Luo*

Luo describes a technique for capturing an image of an object with straight edges (e.g., a business card) that reduces projective distortion in the image, whereby the image is captured only when a straight edge of the object shown in a camera's preview window is substantially parallel to a

IPR2021-01073 Patent 8,977,571 B1

reference line. Ex. 1004, code (57). Luo notes that "today's digital cameras are often integrated into mobile phones, personal digital assistants (PDAs), and laptops," with the result that "people in business can use digital cameras incorporated into mobile phones to quickly and easily capture digital images of their business cards." *Id.* at 4. However, it is "unideal" when one "holds the business card in front of the camera lens with one hand, while holding the camera with the other hand when taking pictures," because of "variable factors such as the distance from the lens to the business card, and the angle of the camera's image plane relative to the front of the business card," such that "the image resulted may contain defects such as projective distortion." *Id.* Figure 2, reproduced below, illustrates an example of Luo's solution:

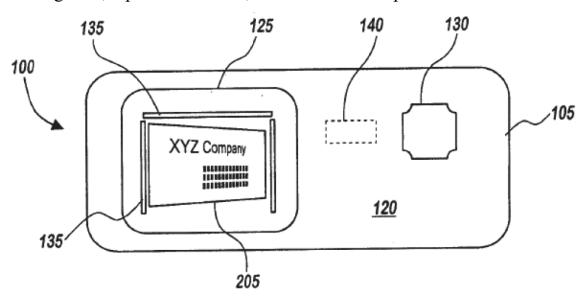


Fig. 2

Figure 2 is a schematic diagram of back 120 of camera system 100. *Id.* at 6.

Back 120 includes preview window 125, which displays an image received by image sensor 115 (shown in Figure 1). Ex. 1004, 6. When mode selection switch 130 is set to a document capture mode, reference line(s) 135 is displayed in preview window 125. *Id.* Reference line 135

IPR2021-01073 Patent 8,977,571 B1

guides the user to position image sensor 115 in an appropriate orientation with respect to the business card being captured. Id. at 7. "[W]hen the system 100 is in the document capture mode, the system 100 provides the user with an image of a captured object, such as a business card, only when the straight edge 205 of the business card is substantially parallel to the corresponding reference line 135 displayed in the preview window 125." Id. at 8. For example, "when the system 100 operates in the document capture mode . . . , the system 100 displays that the object plane 310 and the image plane 320 are not substantially parallel, so the final business card image cannot be captured." Id. To implement this, "image edge detection techniques can be used to reliably calculate the angle between a specific reference line 135 and the corresponding straight edge 205 in the document preview image." Id. Luo's Figure 5 (a larger version of the image shown in preview window 125 of Figure 2) displays three reference lines 135, but Luo notes that two, three, four, or more lines could be used, and the lines need not be orthogonal. Id.

Luo describes "[v]arious techniques" to indicate to the user that the business card is aligned properly, including "an alarm composed of sounds, such as a clicking sound output from the camera system 100," or a "light illuminated in the preview window 125 or the light illuminated elsewhere in the camera system 100." Ex. 1004, 9. "As an alternative, when the straight edge 205 displayed on the preview window 125 is substantially parallel to the corresponding reference line 135, the system 100 can automatically capture the selected image and provide the user with or without instructions." *Id*.

According to Luo, through use of its techniques, "the projective distortion in the image is reduced, and the image is clearer and more

IPR2021-01073 Patent 8,977,571 B1

accurate. With reduced projective distortion, it is more likely to perform an accelerated image capture process, such as an optical character recognition process performed on a text image, with high accuracy." Ex. 1004, 10.

3. Analysis of Claim 1

a) Reason to Combine Acharya and Luo

The parties dispute whether a skilled artisan would have had a sufficient reason to combine the teachings of Acharya and Luo. *See* Pet. 33–39; PO Resp. 45–70; Pet. Reply 1–13; PO Sur-reply 8–26.

Petitioner argues that Luo expressly provides reasons why a skilled artisan would have combined Luo's teachings with Acharya's teachings. Pet. 33–35. For example, Luo explains that it is difficult to capture a high-quality image of a document such as a business card with a hand-held digital camera because it is difficult to get the correct alignment and distance from the camera, resulting in projective distortion, or blurring. *Id.* at 34–35 (citing Ex. 1004, 4). ¹⁴ Specifically, Luo states:

[M]any environments today for using digital cameras are not ideal for capturing high-quality images. For example, a user of a digital camera trying to capture a business card image simply holds the business card in front of the camera lens with one hand, while holding the camera with the other hand when taking pictures. But this makes unideal variable factors such as the distance from the lens to the business card, and the angle of the camera's image plane relative to the front of the business card. Therefore, the image resulted may contain defects such as projective distortion.

¹⁴ The Petition cites to the native pagination. However, because the native pagination repeats, the citations have been changed to reflect the pagination added to Exhibit 1004.

28

IPR2021-01073 Patent 8,977,571 B1

Ex. 1004, 4. Patent Owner attempts to limit this disclosure to the situation where a user holds a business card in one hand and operates the camera with the other, and argues that "the situation described in Luo would appear to be avoided entirely by placing the check on a surface in order to capture it," as shown in ImageNet. 15 PO Resp. 63–64; see also id. at 24 ("Moreover, as the Board pointed out, the user could simply 'have placed the camera directly above the document to avoid document distortion, as taught by Nepomniachtchi." (Quoting Ex. 2101, 50))¹⁶, 49 n.11 ("Dr. Mowry did not evaluate whether ImageNet (or any other remote deposit system in the industry) had issues with projective distortion or blur in captured check images." (Citing Ex. 2116, 30:1–31:13)), 62–63 ("Petitioner's expert conceded at deposition that he has no evidence ImageNet could not address issues of blur and projective distortion." (Citing Ex. 2116, 30:1–31:13)). We do not view Luo's disclosure as so limited; rather, Luo describes a general problem of projective distortion when trying to capture an image of document with a movable hand-held camera that must be aligned manually with the document. We find that an ordinary artisan would have understood that Luo's solution would be beneficial to a user whether the user places the document on a table before capture or holds the document in his or her hand during capture. See Ex. 1002 ¶ 76.

1

¹⁵ ImageNet is not asserted by Petitioner in this proceeding. Its relevance is marginal, if at all, and only as an example of another solution in the art.

¹⁶ The findings of the Wells Fargo IPR panel on Nepomniachtchi's disclosure of placement of the camera is of marginal, if any, relevance to this proceeding, as Acharya, the reference Petitioner relies on, includes no such description.

IPR2021-01073 Patent 8,977,571 B1

As Petitioner observes, Luo solves the problem of projective distortion with a system that uses reference lines in the image preview window to help the user line up the document and automatically captures an image when the document is lined up correctly with the reference lines. Pet. 34–35 (citing Ex. 1004, 8). For example, Luo explains:

The present invention ensures that the front of the object being imaged is substantially parallel to the image plane 320 of the camera system 100 to reduce the projective distortion of the image. For example, when the system 100 is in the document capture mode, the system 100 provides the user with an image of a captured object, such as a business card, only when the straight edge 205 of the business card is substantially parallel to the corresponding reference line 135 displayed in the preview window 125.

Ex. 1004, 8. Referring to its Figure 5, Luo continues:

For the purpose of illustration, the image plane 320 of the business card shown is tilted in relative to system 100 so that the top straight edge 205 of the card cannot be substantially parallel to the corresponding top reference line 135. In such positioning, when the system 100 operates in the document capture mode as described above, the system 100 displays that the object plane 310 and the image plane 320 are not substantially parallel, so the final business card image cannot be captured. As is well known in the art, image edge detection techniques can be used to reliably calculate the angle between a specific reference line 135 and the corresponding straight edge 205 in the document preview image.

Id. Thus, we find that Luo describes a technique of comparing edges of a document to guidelines to help a user line up the camera with the document, resulting in an image with less projective distortion, or blurring.

According to Petitioner, Luo explains that, due to its solution, it is easier and more accurate to use optical character recognition to capture text from the higher-quality image. Pet. 34–35 (citing Ex. 1004, 10). Lou's express description supports this argument:

IPR2021-01073 Patent 8,977,571 B1

[T]he camera system 100 can be used to capture only precise, clear text data images, which can be downloaded to another location before any optical character recognition is performed.... Therefore, the present invention helps users to accurately and reliably capture an image of the front of an object, where the object plane 310 is substantially parallel to the image plane 320. Therefore, the projective distortion in the image is reduced, and the image is clearer and more accurate. With reduced projective distortion, it is more likely to perform an accelerated image capture process, such as an optical character recognition process performed on a text image, with high accuracy.

Ex. 1004, 10. Petitioner argues that this would have been applicable to Acharya, which describes converting machine printed characters on a digital image of a check using optical character recognition software. Pet. 35 (citing Ex. 1003, 4:67–5:2 ("For example, optical character recognition software may be used in conjunction with the DIS or the digital camera to convert machine printed characters on the financial instrument or the digital image of the financial instrument to electronic text."); Ex. 1002 ¶¶ 76–77).

Dr. Mowry testifies that, "[b]ecause of these difficulties in capturing suitable images using handheld devices, Luo provides a motivation for a person of ordinary skill in the art to modify Acharya using the monitoring, feedback, and capture techniques in Luo [to provide] a high likelihood of obtaining images suitable for image processing, which is desirable." Ex. 1002 ¶ 76. Dr. Mowry's testimony is consistent with the express disclosures in Acharya and Luo and, therefore, is credible.

Acharya expressly identifies technology that it uses to capture information from documents, namely optical character recognition, and Luo expressly describes a technique designed to reduce projective distortion when capturing an image of a document, such that optical character

IPR2021-01073 Patent 8,977,571 B1

recognition can be performed more accurately. Dr. Creusere admitted on cross-examination that "correcting geometric distortion will make it easier to perform automatic text recognition." Ex. 1037, 89:1–2. Petitioner contends that its proposed combination would have amounted to applying a known technique to a known device ready for improvement to yield predictable results. Pet. 35–37; see also KSR, 550 U.S. at 417 ("[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill."); Ex. 1002 ¶ 78 ("Implementing Acharya's RCT using Luo's camera system would have simply involved applying a technique that was known to a device that was known and ready for improvement, to yield predictable results."). We agree. This appears to be a textbook example of using a technique that improved one device to improve a similar device in the same way. As we preliminarily observed in the Institution Decision (Dec. at 56–57), a combination of Acharya and Luo would have been no more than "[t]he combination of familiar elements according to known methods" and, thus, likely obvious because it "does no more than yield predictable results." KSR, 550 U.S. at 416.

Petitioner argues, and Dr. Mowry testifies, that a skilled artisan would have had a reasonable expectation of success, as Luo itself explains that the software that would implement the invention would be easy to produce for a generic processor, which Acharya also employs. Pet. 37–38 (citing Ex. 1003, 4:63–65; Ex. 1004, 11; Ex. 1002 ¶ 81). Other similarities Petitioner and Dr. Mowry note that would lead to a reasonable expectation of success include that both Acharya and Luo describe their respective inventions as implemented on the same types of handheld devices, and the

IPR2021-01073 Patent 8,977,571 B1

documents on which both operate have straight edges and are subject to optical character recognition. *Id.* at 38–39 (citing Ex. 1003, 1:21–22, 4:18–20, 4:37; Ex. 1004, 4, 7, 9; Ex. 1002 ¶¶ 82–83). We credit Dr. Mowry's testimony, which is consistent with the disclosures of Acharya and Luo on this point, and find that a skilled artisan would have had a reasonable expectation of success in combining the teachings of Acharya and Luo. Ex. 1002 ¶¶ 81–83.

As we discussed above, Petitioner's evidence of obviousness is particularly strong and straightforward. Nevertheless, Patent Owner offers arguments and evidence in response. Patent Owner groups its arguments into four categories:

- (1) Petitioner's own asserted references—Acharya, Nepomniachtchi, and ImageNet[17]—show that the established method of remote check deposit in the art was to have the customer manually capture or otherwise obtain check images and provide the images and/or check data to the bank for processing.
- (2) The alleged "problem" with digital camera imaging described in Luo—misalignment/distortion caused by incorrect positioning of the camera relative to the document—was already accounted for by pre-capture instructions and deposit processing algorithms employed in the art.
- (3) A person having ordinary skill in the art would have expected Luo's single-criterion automatic capture technique to be less effective and undesirably burdensome on the mobile processor.
- (4) Luo teaches that its alignment guide technique can be applied with both a manual capture implementation and an autocapture implementation. Petitioner's expert has conceded

¹⁷ Neither Nepomniachtchi nor ImageNet is asserted by Petitioner in this proceeding for this ground. Their relevance is marginal, if at all, and only as examples of other solutions in the art.

IPR2021-01073 Patent 8,977,571 B1

that there is no evidence that the auto-capture implementation has any benefit over the manual capture implementation.

PO Resp. 1–2; *see also id.* at 45–70.

As to the first category of arguments, Patent Owner contends that each of Acharya and Nepomniachtchi teaches remote check deposit methods that employ "a 'manual capture' approach where the customer captures check images using a camera and uploads those images and/or other check data to a bank system for deposit processing." *Id.* at 52 (citing Ex. 1003, 3:12–15; Ex. 1016 ¶ 78; Ex. 1014, 37–39); see also id. at 47–48 ("Nepomniachtchi teaches obtaining images suitable for check deposit processing specifically and based on a manually captured image by the user, i.e., without using 'monitoring, feedback, and capture techniques.'" (Citing Ex. 1016 ¶¶ 62– 78)). Patent Owner argues that these manual-capture methods "all leave the decision of when to capture the image in the hands of the customer despite recognizing the possibility of image quality issues in captured images, including the same types of distortions described in Luo." *Id.* at 52–53 (citing Ex. 1016 ¶ 58, 70). According to Patent Owner, "Petitioner has presented no evidence that this established method of remote check deposit in the art was perceived as inadequate for addressing projective distortion or blur," and, instead, that Petitioner presented evidence that ImageNet was commercially successful in manually capturing mobile check data. *Id.* at 49 (citing Pet. 10–12); see also id. at 50 ("Petitioner's expert was asked if he had any actual evidence that the solutions for blur and projective distortion addressed in Nepomniachtchi were any less effective than Luo. He conceded he had none." (Citing Ex. 2116, 19:14–20:2, 21:19–22)).

IPR2021-01073 Patent 8,977,571 B1

As to Acharya, Petitioner argues that it is agnostic as to whether images are captured manually or automatically. Pet. Reply 7–8. Patent Owner's citation to Acharya (Ex. 1003, 3:12–15) does not support its contention that Acharya employs a manual capture approach and, instead, merely states that "the banking customer captures the digital image of the financial instrument by the scanner or the digital camera and prepares a file storing the digital image." As Petitioner points out (Pet. Reply 7–8), Dr. Creusere has admitted that Acharya does not state whether images are captured manually or automatically. *See* Ex. 1037, 120:8–20. Thus, Acharya's teachings do not support Patent Owner's argument that manual capture was the established and preferred method for remote check deposit.

As to Patent Owner's argument that Nepomniachtchi and ImageNet show that manual capture was the preferred method for remote check deposit (PO Resp. 52–53, 55–56 (citing Ex. 1016 ¶¶ 58, 70, 78; Ex. 1014, 37–39; Ex. 2110)), simply pointing to examples of art using manual capture does not show that manual capture was established and preferred over automatic capture, or suggest that a skilled artisan would not have pursued other solutions. *Cf. In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) ("The prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed in the '198 application. . . . Accordingly, mere disclosure of alternative designs does not teach away."). Patent Owner points to nothing in Nepomniachtchi or ImageNet that criticized, discredited, or would have discouraged automatic capture of check images.

Patent Owner also argues that Acharya teaches other ways in which a customer can deposit a check that do not include image capture, such as the

IPR2021-01073 Patent 8,977,571 B1

customer receiving a digital image of a check from the payer or the customer entering data into the system using a keypad or keyboard. PO Resp. 54–55 (citing Ex. 1003, 2:63–66, 3:20–21, 7:5–7, 7:14–19, 7:30–33, 7:47–52). From these examples, Patent Owner concludes that "Acharya's multitude of options for providing images and/or check data to the bank system indicate that the quality of the check image is not of particular importance in Acharya's system." *Id.* at 54 (citing Ex. 2115 ¶ 31). Although Patent Owner cites Dr. Creusere's testimony, that testimony does not support Patent Owner's argument. Nor does any of the other evidence Patent Owner cites. Acharya's description of multiple ways of capturing check data does not lead to a conclusion that the quality of a check image is unimportant in Acharya's system.

Patent Owner also argues that "Petitioner's expert concedes that there is no statement in Acharya that it has any issues with projective distortion or blur." PO Resp. 55 (citing Ex. 2116, 33:16–24); see also id. at 49 n.11 ("Dr. Mowry... testified that Acharya did not identify any problems with projective distortion or blur in its existing manual capture implementation." (citing Ex. 2116, 33:16–24)); PO Sur-reply 11 ("Acharya does not disclose that its optical character recognition system suffers from projective distortion problems. And any missing information can be typed in by the user." (Citing Ex. 1003, 7:36–41)). Patent Owner does not cite any authority for its implicit argument that a reference must expressly state a problem before it can be ready for improvement. Indeed, the Supreme Court has rejected such a "rigid approach" of requiring a teaching, suggestion, or motivation to combine to be expressed in a reference, in favor of "an expansive and flexible approach" to evaluating obviousness. KSR, 550 U.S. at 415. In any case, Luo expressly states that its technique reduces

IPR2021-01073 Patent 8,977,571 B1

projective distortion and improves optical character recognition. Ex. 1004, 7. Dr. Mowry testifies that a skilled artisan would have recognized that Luo's solution could be used to improve check processing, as in Acharya's system, in the same manner. Ex. 1002 ¶ 76; see also KSR, 550 U.S. at 417 ("[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill."). Dr. Mowry's testimony is consistent with the teachings of the prior art and we credit this testimony.

Patent Owner's second category of arguments is that "The 'Problem' Supposedly Motivating a [Person of Ordinary Skill in the Art] To Combine Acharya/Luo Was Already Addressed by Deposit Processing In The Art." PO Resp. 56–64. According to Patent Owner, a person having ordinary skill in the art considered "projective distortion" a solved problem in view of references like Nepomniachtchi teaching post-capture distortion correction. PO Sur-reply 12–13.

Patent Owner argues that, "to the extent that some check images captured in Acharya's system may be inadequate for optical character recognition, Acharya's system already provides a solution to that problem as part of its deposit processing step," namely by supplementing optical character recognition with the user manually entering missing data. PO Resp. 57 (citing Ex. 1003, 8:16–25). According to Patent Owner, "[t]he petition does not argue that a [person having ordinary skill in the art] would have been motivated to eliminate this step of Acharya's process." *Id.* This argument is not persuasive. It was not incumbent on Petitioner to assert that a skilled artisan would have removed one solution to make room for another, although the benefits of elimination of manual entry would have been self-

IPR2021-01073 Patent 8,977,571 B1

evident and a matter of common sense. *See Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009) ("[W]hile an analysis of obviousness always depends on evidence that supports the required *Graham* factual findings, it also may include recourse to logic, judgment, and common sense available to the person of ordinary skill that do not necessarily require explication in any reference or expert opinion."); *KSR*, 550 U.S. at 421 ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.").

Moreover, Patent Owner does not cite any authority for the proposition that, simply because a prior art reference describes one solution to a known problem, a skilled artisan would not have considered other solutions to that same problem. *Cf. Fulton*, 391 F.3d at 1201 ("The prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed in the '198 application. . . . Accordingly, mere disclosure of alternative designs does not teach away."). The Federal Circuit has explained that:

a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine. See [Winner Int'l Royalty Corp. v. Wang, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000)] ("The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another."). Where the prior art contains "apparently conflicting" teachings (i.e., where some references teach the combination and others

IPR2021-01073 Patent 8,977,571 B1

teach away from it) each reference must be considered "for its power to suggest solutions to an artisan of ordinary skill. . . . consider[ing] the degree to which one reference might accurately discredit another."

Medichem, S.A. v. Rolabo, S.L., 437 F.3d 1157, 1165 (Fed. Cir. 2006) (quoting *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991) (alterations by Federal Circuit)).

In this case, Patent Owner's argument actually supports Petitioner's position. As noted above, Patent Owner argues that Acharya itself does not identify projective distortion as a problem. *See* PO Resp. 55. However, as Patent Owner points out, Acharya describes manual entry of data to correct data not captured sufficiently by optical character recognition. *Id.* at 57. Thus, although Acharya does not expressly use the terms "projective distortion" or "blur," it recognizes that its image capture technique might be insufficient for optical character recognition and, thus, was ready for improvement. As Petitioner demonstrates above, techniques such as those taught by Luo would provide such an improvement. *See KSR*, 550 U.S. at 419–20 ("One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims.").

Patent Owner also argues that Nepomniachtchi¹⁸ recognized the problem caused by projective distortion and described fixing such distortions at the server receiving the image of a check (rather than at the device capturing the image of the check). PO Resp. 58–60. Patent Owner contends

¹⁸ As noted above, Nepomniachtchi is not asserted by Petitioner in this ground.

IPR2021-01073 Patent 8,977,571 B1

that "Nepomniachtchi's technique for correcting projective distortion in captured check images is equally applicable to Acharya's embodiments, whether processing occurs on the mobile device or at the server." PO Surreply 13. According to Patent Owner,

to the extent a [person having ordinary skill in the art] was concerned that images captured via digital camera may contain the distortion taught by Luo, he or she would have understood that type of defect to be addressed by server-side processing (which Acharya is already performing on received check images) and would not see a need to make drastic changes to the image capture process on the customer device.

PO Resp. at 59 (citing Ex. 2115 ¶¶ 33–34); ¹⁹ see also id. at 8 ("Nepomniachtchi teaches that these image quality issues can be addressed through post-capture processing so that the document can be processed and data extracted successfully."), 23 ("[T]he Board determined that 'Nepomniachtchi as a whole already provides a solution that addresses image distortions." (Quoting Ex. 2101, 49))²⁰; PO Sur-reply 10 ("[T]here is no competent evidence that a [person having ordinary skill in the art] would look to implement Luo's alignment guide-based autocapture for business

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¹⁹ Dr. Creusere cites Exhibit 1003, column 7, line14–33 and column 8, lines 16–9:10 for his conclusion that Acharya teaches server-side check processing that included image correction algorithms. Ex. 2115 ¶ 33. Acharya does not support this testimony, and instead, to the extent Acharya teaches where checks are processed to obtain data, it suggests that check processing happens on the device capturing the image. Ex. 1003, 7:14–33. Dr. Cruesere's testimony on this point lacks credibility and is entitled to no weight. *See* 37 C.F.R. 42.65(a).

²⁰ The findings of the Wells Fargo IPR panel on Nepomniachtchi's disclosure of correcting for projective distortion at the server is of marginal, if any, relevance to this proceeding, as Acharya includes no such description.

IPR2021-01073 Patent 8,977,571 B1

cards in Acharya in an attempt to solve the same 'projective distortion' problem as the check-deposit specific reference Nepomniachtchi." (Citing Ex. 2115 ¶¶ 35–36)). Patent Owner further argues that another reference, Blackson,²¹ also teaches techniques for correcting check images at the server receiving the images (rather than at the device capturing the images). PO Resp. 60–61.

Patent Owner argues that "[t]hese references [which we presume are Nepomniachtchi and Blackson] show that the preferred approach to dealing with perspective distortion/misalignment issues in check deposit systems, at the time of the invention, was *post-capture* image correction." PO Resp. 61–62. Patent Owner argues that Blackson describes Luo's approach, requiring precise alignment, as inferior. PO Resp. 61–62 (citing Ex. 2108, 2:61–67).

Patent Owner's arguments are misplaced. These arguments largely depend on the teachings of Nepomniachtchi, which Petitioner does not rely on for this ground. Nepomniachtchi might teach techniques to correct for projective distortion at a server that receives an image of a check. But Patent Owner points to no persuasive evidence that Acharya includes that disclosure. Patent Owner's statement that "the preferred approach to dealing with perspective distortion/misalignment issues in check deposit systems, at the time of the invention, was *post-capture* image correction," PO Resp. 61–62, is mere attorney argument unsupported by persuasive evidence. We do not find that post-capture image correction was the preferred approach, that post-capture image correction was preferred to preventing distortion at the time of image capture, or that these two techniques would have been

²¹ Blackson is not asserted by Petitioner in this proceeding.

IPR2021-01073 Patent 8,977,571 B1

mutually exclusive. But even if post-capture image correction were the preferred approach, that would not undermine Petitioner's contentions. *See PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197–98 (Fed. Cir. 2014) ("Our precedent, however, does not require that the motivation be the best option, only that it be a suitable option from which the prior art did not teach away."); *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("This court has further explained that just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes." (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994))); *Fulton*, 391 F.3d at 1200 ("[O]ur case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention."); *see also Mouttet*, 686 F.3d at 1331 ("A reference may be read for all that it teaches, including uses beyond its primary purpose.").

As to Blackson, Petitioner argues that Blackson is inapposite, as it describes image capture on ATM hardware, rather than mobile devices. Pet. Reply 6 (citing Ex. 2108, 2:65–3:9). We agree with Petitioner. Blackson states that automated banking machines (which we understand to be synonymous with ATMs) have drawbacks in that checks often must be precisely aligned for reading magnetic ink coding (MICR) on the checks. Ex. 2108, 2:60–3:1. One aspect of Blackson's solution is an improved transport system and aligning device for better positioning checks. *Id.* at 5:14–39. Patent Owner does not persuasively explain the relevance of Blackson to check image capture using mobile devices.

Patent Owner further argues that Nepomniachtchi also teaches premanual capture techniques for avoiding projective distortion and blur, such as prompting the user to take another picture if the first is blurry. PO Resp.

IPR2021-01073 Patent 8,977,571 B1

60 (citing Ex. 1016 ¶¶ 61, 62, 73, 85; Ex. 2101 ¶¶ 49–50); see also id. at 10 ("Nepomniachtchi also teaches that the mobile device has the 'ability to identify poor quality images' and 'if the quality of the image is determined to be poor, a user may be prompted to take another image." (Quoting Ex. $1016 \, \P \, 62)$, 49-50 ("[T]he Board previously found that this manual capture approach (as reflected in Nepomniachtchi) 'already provides a solution that addresses image distortions,' including '(1) utilizing the user's judgment (e.g., placing the camera directly above the document, rather than at an angle, to avoid image distortion) for the pre-capturing analysis and '(2) performing the image quality analysis on the mobile device to quickly determine whether the image can be accepted, needs correction, or needs retaking while the user is still physically close to the document and before starting another task." (Quoting Ex. 2101, 49)). Patent Owner argues that "Dr. Mowry identified no evidence suggesting Nepomniachtchi's projective distortion solution was ineffective." PO Resp. 9 (citing Ex. 2116, 19:14– 20:2, 21:19-22)).

Although Patent Owner does not expressly argue that that Nepomniachtchi's and ImageNet's teachings of pre-manual capture and post-capture processing solutions teaches away from a combination of Acharya and Luo, Patent Owner appears to argue that a skilled artisan would have been dissuaded from pursuing that combination because of the solutions provided by Nepomniachtchi and ImageNet. Once again, "mere disclosure of alternative designs does not teach away." *Fulton*, 391 F.3d at 1201. We see no persuasive evidence supporting such a contention or that Nepomniachtchi's and ImageNet's teachings, if applied by Petitioner, would have been incompatible with a combination of Acharya and Luo. Indeed, Patent Owner does not point to any statements in Nepomniachtchi,

IPR2021-01073 Patent 8,977,571 B1

Blackson, Yoon, or Mitek (another reference not relied upon by Petitioner for this Ground) that would discourage a user from combining Acharya and Luo, or lead a skilled artisan in a direction divergent from that combination.²²

In any case, the fact that other solutions to projective distortion exist does not suggest that Luo's solution would be inapplicable to Acharya. As we explain above, Petitioner presents strong evidence that it would be. *See* Pet. 33–39.

As to Patent Owner's third category of arguments, Patent Owner argues that a skilled artisan "would have been discouraged from incorporating Luo's technique into Acharya given the significant associated drawbacks." PO Resp. 65. This is a more explicit argument by Patent Owner that the prior art teaches away from Petitioner's proposed combination. According to the Federal Circuit:

A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.

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²² The findings of the Wells Fargo IPR panel relating to the features of Nepomniachtchi and Yoon and the solutions they provide for minimizing projective distortion (Ex. 2101, 42–64) are based on the particular facts of that proceeding, including the express teachings of those references, not present in the references advanced by Petitioner for this Ground, and the particular arguments made by the petitioner in that proceeding. Thus, they are of little, if any, relevance to this proceeding. Patent Owner argues that Dr. Mowry admitted that Nepomniachtchi is directed to the same problem as Acharya and that Nepomniachtchi's methods of addressing projective distortion would be relevant to Acharya. PO Resp. 14 (citing Ex. 2116, 35:1–9, 124:12–23). That is not an admission that the particular features of Nepomniachtchi cited by Patent Owner are taught in or implicitly a part of Acharya.

IPR2021-01073 Patent 8,977,571 B1

The degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant.

Gurley, 27 F.3d at 553.

First, Patent Owner argues that incorporating Luo's technique into Acharya's system would have imposed "additional processing overhead and complexity on the customer's device as compared to the existing manual capture system" and that "[t]his type of processing, especially when done in real-time, was considered computationally-intensive in 2009." PO Resp. 66 (citing Ex. 2115 ¶ 35). The only evidence Patent Owner offers to support this assertion is the testimony of its expert, who largely copies Patent Owner's argument and does not identify the basis for the testimony. As such, the testimony is entitled to little weight. See 37 C.F.R. § 42.65(a); see also Velander v. Garner, 348 F.3d 1359, 1371 (Fed. Cir. 2003) ("It is within the discretion of the trier of fact to give each item of evidence such weight as it feels appropriate."); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 294 (Fed. Cir. 1985) ("Lack of factual support for expert opinion going to factual determinations, however, may render the testimony of little probative value in a validity determination."). We note that Luo describes its technique as implemented on conventional computing equipment on portable devices available prior to 2009 without mention of concerns over processing overhead. Ex. 1004, 11. Patent Owner's evidence is insufficient to establish that concerns over processing overhead would have dissuaded a skilled artisan from pursuing a combination of Acharya and Luo.

IPR2021-01073 Patent 8,977,571 B1

Patent Owner argues that the Board, in the Wells Fargo IPR, determined that implementing pre-capture monitoring and auto-capturing features on a mobile device would impose additional computational burdens on that mobile device. PO Resp. 22 (citing Ex. 2101, 26–27, 34). Patent Owner argues that Petitioner ignores this finding. *Id.* at 23. Patent Owner overstates the Board's findings in the Wells Fargo IPR or their relevance to this proceeding.

In the Wells Fargo IPR, a Board panel characterized one of the petitioner's arguments as "one of ordinary skill in the art would have been motivated to combine Nepomniachtchi and Yoon to: (1) reduce the computational burden." Ex. 2101, 25. The petitioner in that proceeding argued that the algorithm Nepomniachtchi performed on the server to correct skew was computationally intensive, and that improving the user's ability to capture the image without skew would have minimized the need to use this algorithm and, accordingly, would have reduced the burden of computations performed by the mobile device. Id. at 26. Against this backdrop, the Wells Fargo IPR panel determined that adding pre-capture monitoring and autocapturing features on Nepomniachtchi's mobile device (per the teachings of Yoon) would not have decreased computational burden on the mobile device, because Nepomniachtchi teaches correcting skew at the server, not the mobile device. *Id.* at 26–27. Instead, the Board panel accepted Patent Owner's argument that adding such features to Nepomniachtchi's mobile device would increase the computational burden at the mobile device. *Id.* Thus, the Board panel determined that Patent Owner's evidence undermined the petitioner's assertion (not made by Petitioner in this proceeding) that Yoon's teaching would reduce the computation burden at the mobile device:

IPR2021-01073 Patent 8,977,571 B1

Significantly, Petitioner's argument rests on the premise that "the combination lowers the burden of the correction step" so that it would reduce the burden of the computation performed by the mobile device. Nepomniachtchi, however, teaches using the server to perform the correction step in its preferred embodiment. Notably, Nepomniachtchi teaches that "the server may clean up the image by performing auto-rotate, de-skew, perspective distortion correction, cropping, etc." and that "a server based implementation might be employed to off-load processing demands from the mobile device." Any reduction in the correction processing would result in an efficiency gain at the server, not the mobile device. Therefore, Petitioner does not explain sufficiently how adding Yoon's monitoring and capturing features on the mobile device would reduce the computation burden on the mobile device.

Id. at 28 (internal citations omitted). The Board panel further determined that Nepomniachtchi's skew-correction algorithm was computationally intensive because the petitioner's expert admitted as much, and reasoned that "a relevant artisan would have used the server to perform the correction processing, instead of the mobile device, in order to avoid excessive burden on the mobile device, slower response times, and user dissatisfaction." Id. at 31. Thus, the Wells Fargo IPR panel found that Patent Owner's evidence undermined the petitioner's argument on the particular facts of that proceeding, including the particular technical features of prior art references not asserted here. We do not understand the Wells Fargo IPR panel to have made general findings of teachings away that would be applicable to prior art references not asserted in that proceeding. As such, the Wells Fargo IPR panel's findings are of marginal relevance here.

Second, Patent Owner argues that "alignment of the document relative to the camera is only one of many factors that impact the quality, particularly when capturing an image of a check for deposit," and that

IPR2021-01073 Patent 8,977,571 B1

adding Luo's automatic capture to Acharya's system would have ignored those other factors, resulting in images not sufficient for deposit. PO Resp. 67–68; PO Sur-reply 22 ("[T]here is no dispute that the automatic capture technique taught by Luo triggers capture of an image based solely on whether the edges of the document line up with the reference lines displayed on the screen. As Dr. Creusere explains, a [person having ordinary skill in the art] would have been discouraged from using this technique for check image capture because there are a multitude of factors that impact whether a captured check image can be successfully processed for deposit, many of which have nothing to do with alignment or 'projective distortion' that Luo purportedly corrects." (Citing Ex. 2115 ¶¶ 27, 28, 36)). According to Patent Owner, Luo's approach has "two drawbacks":

(1) Luo's system will automatically capture images when the reference lines are aligned, even if the image is insufficient for deposit for other reasons not analyzed by Luo; and (2) Luo's system will <u>not</u> capture images when the reference lines are <u>not</u> aligned, even if the overall image is sufficient for deposit.

PO Resp. 67. Patent Owner argues that the first alleged drawback "results in an increase in the number of deposit errors" and the second "results in user frustration." *Id.* (citing Ex. 2115 ¶ 36). Patent Owner further argues that

a [person having ordinary skill in the art] would have expected Luo's single-criterion automatic capture technique to be less effective and undesirably burden[some] to the mobile processor implement[ation] in comparison to [the] existing manual capture technique employed by Acharya and [Nepomniachtchi], and ImageNet, and would have been discouraged from making the combination, particularly in view of the limited and uncertain benefits of doing so described above.

Id. at 51 (citing Ex. 2101, 56).

IPR2021-01073 Patent 8,977,571 B1

In support of this argument, Dr. Creusere testifies that, in Petitioner's combination of Acharya and Luo, the camera "would automatically capture a check image when the reference lines are substantially aligned with the edges of the check, regardless of the quality of the image with respect to other factors such as brightness, contrast, focus, background, legibility of critical information such as the MICR line, and so forth." Ex. 2115 ¶ 36 (citing Ex. 1016 ¶¶ 58–62). On the other hand, Dr. Creusere testifies, "the Acharya/Luo combination would also only capture images when the reference lines are at least substantially aligned with the edges of the check, even if the overall image was suitable for deposit." Id. According to Dr. Creusere, "[b]oth of these concerns would discourage a person of ordinary skill in the art from making the combination in the first place, particularly given the alternatives available in the art." Id. Dr. Creusere does not identify the basis for his testimony that an Acharya/Luo combination would ignore other image quality factors that he states a skilled artisan would have considered "critical." Thus, this testimony is entitled to little weight. It also is inconsistent with Luo, which states that its "camera system 100 can be used to capture only precise, clear text data images, which can be downloaded to another location before any optical character recognition is performed," and that

the present invention helps users to accurately and reliably capture an image of the front of an object, where the object plane 310 is substantially parallel to the image plane 320. Therefore, the projective distortion in the image is reduced, and the image is clearer and more accurate. With reduced projective distortion, it is more likely to perform an accelerated image capture process, such as an optical character recognition process performed on a text image, with high accuracy.

IPR2021-01073 Patent 8,977,571 B1

Ex. 1004, 10. Thus, Luo itself suggests that its image capture technique would have been sufficient to capture images of checks suitable for deposit.

Petitioner responds that Patent Owner's argument that the combination would replace manual capture with autocapture is misplaced because Acharya does not describe how it captures check images. Pet. Reply 7–8. As explained above, we agree. Petitioner also argues that, even if using autocapture, a skilled artisan would still apply judgement and knowledge in obtaining check images. *Id.* at 8–9. Petitioner points to Dr. Creusere, who testified on cross-examination that a skilled artisan would have understood that an image needs to have a sufficient light brightness and could manually adjust the position of a digital camera to achieve sufficient brightness, and that it was general logic and common sense that someone would want an acquired image to be in focus. Ex. 1037, 61:14–62:5, 67:3– 7. As noted above, a skilled artisan would have been an experienced engineer. Petitioner also introduces evidence, including testimony from Dr. Mowry, that camera phones in 2008 had features such as autofocus and automatic exposure controls. Reply 8–9 (citing Ex. 1036 ¶¶ 28–34 (citing Ex. 1053 Ex. 1054)). Dr. Creusere admitted as much. Ex. 1037, 67:13–21, 68:1-6. As noted above, a skilled artisan would have been an experienced engineer. We credit Dr. Mowry's testimony that Luo's autocapture feature would have been used with such admittedly known techniques. Ex. 1036 ¶¶ 28–34; see also KSR, 550 U.S. at 421 ("A person of ordinary skill is also a person of ordinary creativity, not an automaton."). Thus, we do not agree that a skilled artisan would have been dissuaded from combining Acharya and Luo.

Patent Owner argues that Wells Fargo IPR panel concluded that, in a combination of Nepomniachtchi and Yoon (once again, references not

IPR2021-01073 Patent 8,977,571 B1

asserted for this Ground), the system would automatically capture an image as soon as the borders of the check aligned with the alignment guide, even if the image was not suitable for capture. PO Resp. 68 (citing Ex. 2101, 55); see also id. at 25–26 ("[T]he Board agreed that there would be drawbacks to the proposed combination [of Nepomniachtchi and Yoon given that it] would 'automatically capture the image as soon as the borders of the check image aligned with the rectangular alignment guide, whether or not the image was suitable in other respects.' The same criticism would apply to the proposed combination with Luo." (Quoting Ex. 2101, 55)), 26 ("The Board found that a [person haiving ordinary skill in the art] 'would have no reason to expect that a system evaluating only alignment and/or brightness prior to capture would automatically capture check images that were suitable for deposit processing based on all of the criteria identified in Nepomniachtchi' and that 'replacing a user's judgment that is based on numerous factors, with an auto-capture system based solely on alignment, would not minimize the need for retaking the images, but would instead introduce additional errors,' such as capturing images when the check is 'upside down' or does not have 'MICR information [] in the correct location' or has inadequate 'resolution or focus." (Quoting Ex. 2101, 56–58) (first alteration added)). The Wells Fargo IPR panel based its findings on admissions by the petitioner in that case that combining Nepomniachtchi and Yoon would replace the user's judgment about whether the image was aligned. Ex. 2101, 54. The Wells Fargo IPR panel also relied on admissions from the expert witness for the petitioner in that proceeding regarding Yoon, a reference not asserted in this proceeding. Id. at 57. Thus, the Wells Fargo IPR panel made its findings and conclusions based on the particular record of that proceeding, which considered different prior art and testimony than Petitioner asserts here.

IPR2021-01073 Patent 8,977,571 B1

Accordingly, those findings and conclusions are of marginal relevance in this proceeding.

Patent Owner further argues that "Petitioner has stated affirmatively that the prior art lacks the teachings required to determine, by monitoring an image for automatic capture, when the captured image will meet the requirements for deposit." PO Resp. 68–69; see also PO Sur-reply 25–26. Here, Patent Owner points to Petitioner's Motion for Summary Judgement of Enablement in the Texas case, which Patent Owner opposed, and Petitioner lost. PO Resp. 56 (citing Ex. 2111, 21); Tr. 45:20–47:9. Although the exhibit provided by Patent Owner is heavily redacted, it appears that, in the Texas case, Petitioner argued that the Specification of the '779 patent²³ did not describe additional monitoring criteria to ensure that a check image is in a form suitable for deposit, and the prior art did not include the teachings missing from the '779 patent. Ex. 2111, 21–25. Thus, at most, Petitioner argued that the prior art did not provide more detail than the '779 patent itself. In any case, Patent Owner opposed that motion and Petitioner did not prevail. Thus, any such statements in Petitioner's Motion for Summary Judgement of Enablement are of marginal value here.

For its fourth category of arguments, Patent Owner contends that Luo describes its automatic capture as an alternative approach to manual capture, and that Luo does not state that automatic capture is necessary to reduce projective distortion or blurring. PO Resp. 69 (citing Ex. 1004, 9). According to Patent Owner, "a [person having ordinary skill in the art] reading Luo would expect that the same benefits could be achieved by simply displaying the reference lines on the screen and providing an

²³ US 8,699,779 B1, which is the subject of IPR2021-01070.

IPR2021-01073 Patent 8,977,571 B1

'indication' to the user that the image may be captured when the lines are substantially parallel to the edges of the document, as described in Luo." *Id.* at 69–70 (citing Ex. 1004, 9–10). Patent Owner argues that "Petitioner never explains why a [person having ordinary skill in the art] would have been motivated to go beyond the primary embodiment of Luo and add the automatic capture alternative." *Id.* at 70; see also PO Sur-reply 17 ("Petitioner offers no reason why a [person having ordinary skill in the art] would have been motivated to adopt the automatic capture option of Luo, which would indisputably add complexity and overhead to the combination, if the manual capture embodiment already provided the same benefits."). Patent Owner argues that using Luo's reference lines with manual capture, and without automatic capture, "would provide Lou's stated benefits and avoid the downsides [of the combination] described above, such as increased errors and user dissatisfaction due to automatically capturing images at the wrong times." PO Resp. 70 (citing Ex. 2115 ¶ 35); see also id. at 52 ("The Petition provides no explanation as to why, even if a [person having ordinary skill in the art] would be motivated to aid an alignment guide monitored by the processor, it would then choose to add auto-capture, which would strip away human ability to ensure that other criteria that are necessary for a successful deposit are satisfied."). Patent Owner argues that "there must be a factual basis for why a [person having ordinary skill in the art] would strip away human judgment regarding the multiple factors that the Reply

IPR2021-01073 Patent 8,977,571 B1

acknowledges can result in an image of sufficient quality, and replace it with automatic capture." PO Sur-reply 17–18 (citing Ex. 2115 \P 9 30–35).²⁴

In response, Petitioner argues that, "as Luo makes clear that, once the mobile device determines that the monitoring criterion is satisfied, automatically capturing an image (instead of manually) is merely a choice between the two equally suitable techniques." Pet. Reply 6 (citing Ex. 1002 ¶ 75).

As we explained above, Acharya does not explain in detail how images of checks are captured (or what role human judgement would play), so Patent Owner does not have a basis to argue that Petitioner's combination would "strip away human judgment" from Acharya's technique. And as we preliminarily observed in the Institution Decision (at 55), Luo describes both the reference lines and the automatic capture feature as beneficial to reducing projective distortion. Specifically, "[t]he reference line 135 is used to guide the user of the system 100 to position the image sensor 115 in an appropriate orientation with respect to, for example, a business card object," Ex. 1004, 7, and "when the straight edge 205 displayed on the preview window 125 is substantially parallel to the corresponding reference line 135, the system 100 can automatically capture the selected image and provide the user with or without instructions," *id.* at 9. Luo's reference lines help the user position the camera in an orientation that will result in the camera

²⁴ Patent Owner also argues that the Wells Fargo IPR panel was not persuaded that a skilled artisan would have been motivated to add Yoon's automatic capture feature to Nepomniachtchi. PO Sur-reply 16–17 (citing Ex. 2101, 50). The Wells Fargo IPR panel reached its findings and conclusions based on the particular facts of that case, including prior art references not at issue in this proceeding. Thus, they are of marginal, if any, relevance here.

IPR2021-01073 Patent 8,977,571 B1

automatically capturing an image of the document. These features work together to capture an image with reduced projective distortion and the current record suggests that the combined features would have improved Acharya in the same way. Ex. 1002 ¶ 112; see KSR, 550 U.S. at 417. Moreover, as explained above, we find that the prior art does not teach away from automatic capture of images.

However, even if the evidence suggested that manual capture had advantages over automatic capture (it does not), "just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes." *Mouttet*, 686 F.3d at 1334; *accord Fulton*, 391 F.3d at 1200. Rather, Luo "may be read for all that it teaches, including uses beyond its primary purpose." *Mouttet*, 686 F.3d at 1331. Luo expressly teaches automatic capture used in conjunction with reference lines, and describes the combined solution as one technique to reduce projective distortion in a captured image, resulting in more accurate optical character recognition. Ex. 1004, 9–10. For the reasons given above, we find that this teaching would have been similarly applicable to Acharya's images of checks captured and processed by optical character recognition, and would have improved the optical character recognition in a similar way, resulting in images of checks more likely to be in a form sufficient for deposit. *See KSR*, 550 U.S. at 417.

Patent Owner argues that the combination of Acharya and Luo is a situation in which disadvantages outweigh uncertain benefits. PO Resp. 69 (citing *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1329 (Fed. Cir. 2019)). According to Patent Owner,

the issue is not whether it is theoretically feasible for a mobile device at the time to perform the processing required to

IPR2021-01073 Patent 8,977,571 B1

implement automatic capture, but whether a [person having ordinary skill in the art] would have found it desirable (on balance) to *add* the additional complexity and processing required to continually monitor an image in view and determine the appropriate time to capture the image, as opposed to simply waiting for a manual button input from the user.

PO Sur-reply 23–24 (citing Ex. 2115¶ 35; Ex. 2116, 24:11–25:16); see also id. at 20–26 (discussing disadvantages). We disagree. As explained above, the benefits of Luo's alignment guide and automatic capture to document capture, such as in Acharya, are not uncertain and, instead, are straightforward and expressly stated in Luo. Patent Owner's evidence of disadvantages is unpersuasive and rests primarily on its analysis of prior art references not asserted by Petitioner and of marginal relevance to this proceeding.

In sum, on the complete record, Petitioner has shown that a skilled artisan would have had reasons with rational underpinning to combine the teachings of Acharya and Luo, with a reasonable expectation of success.

- b) Depositing a Check (Limitation [1-pre])/Passes the Monitoring Criteria (Limitation [1b])
 - (1) Petitioner's Arguments

The preamble of claim 1 recites "[1-pre] [a] non-transitory computer-readable medium comprising computer-readable instructions for depositing a check that, when executed by a processor, cause the processor to."

Ex. 1001, 21:6–8. Claim 1 further recites that the instructions cause the processor to "[1b] capture the image of the check with the camera when the image of the check passes the monitoring criterion." Ex. 1001, 21:13–14. In discussing claim construction, Petitioner proposes that we treat the preamble as limiting. Pet. 22, 40–43. In the Institution Decision, we treated the preamble as limiting and advised the parties that "[i]f either party contends

IPR2021-01073 Patent 8,977,571 B1

the preamble is not limiting, the construction should be addressed in the Patent Owner's Response or Petitioner's Reply." Inst. Dec. 45 n.20. Neither party argued that the preamble was not limiting and, instead, argued whether the prior art taught a portion of the preamble. *See* PO Resp. 35–45 (arguing prior art does not teach "depositing a check"); Pet. Reply 19–28 (treating "depositing a check" as limiting). Accordingly, we treat the preamble as limiting in the absence of any argument to the contrary.

Petitioner argues Acharya teaches the preamble. Pet. 40–43. Specifically, Petitioner directs our attention to Acharya's RCT 100, which includes a CPU and memory which holds instructions for providing a check to a depository in a form sufficient to allow money to be credited to an account. *Id.* at 40–42. Petitioner further argues that the "instructions, when executed by a processor, cause the processor to perform certain steps including, for example, those provided below in elements [1a]–[1c] when combined with Luo." *Id.* at 42–43.²⁵

Petitioner also argues that the combination of Acharya and Luo teaches limitation [1b]. Pet. 53–55. Specifically, Petitioner argues that Acharya "capture[s] the image of the check with the camera." *Id.* at 53. According to Petitioner, Acharya teaches "that 'the banking customer **captures the digital image of the financial instrument**' (EX1003, 3:12-13), 'e.g. a paper check' (*id.*, 1:23), 'by the digital camera' (*id.*, 3:13)." Pet. 53. Petitioner further argues Luo teaches that the image is captured "at or after the moment the image of the check passes the monitoring criterion." *Id.* at 53–54 (citing Ex. 1004, 9, 10).

²⁵ Petitioner italicizes the names of prior art references. Those italics are omitted in this Decision.

IPR2021-01073 Patent 8,977,571 B1

Petitioner also argues that Luo's alignment guides are sufficient for "depositing a check" and "passes the monitoring criterion" limitations. *See* Pet. Reply 19–28. The specific argument relating to "depositing a check" and "passes the monitoring criterion" are as follows.

First, Petitioner argues the challenged claims are system claims and Patent Owner "raises no serious argument that Acharya fails to disclose such computer readable instructions." *Id.* at 20.

Second, Petitioner argues that independent claim 1 requires passing a single monitoring criterion and that it "do[es] not require that passing that criterion guarantee a perfectly readable check image every time." Pet. Reply 20. Petitioner further argues that "Acharya/Luo renders the independent claims invalid by obtaining check data without error based on passing the alignment guide monitoring criteria under at least some conditions." *Id.* at 21 (citing *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002 (Fed. Cir. 2016); *Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003), Ex. 1036 ¶ 55–57). According to Petitioner, "[t]he technical objective of the '571 patent is not to guarantee success under all circumstances, but '[t]o **increase the likelihood** of capturing a digital image of the check 108 that **may be** readable and processed such that the check 108 can be cleared' using '**one or more** monitoring criteria." *Id.* at 21 n.13 (first alteration added) (quoting Ex. 1001, 3:54–58).

Third, Petitioner argues that Luo's alignment guides are the same as an expressly disclosed embodiment in the '571 patent. Pet. Reply 23–24 (citing Ex. 1001, 7:38–57).

Fourth, Petitioner argues, because the prior art teaches each of the "passes the monitoring criteria" and "depositing a check" limitations, it is of

IPR2021-01073 Patent 8,977,571 B1

no moment that OCRing²⁶ a check is not like OCRing a business card. Pet. Reply 24 (citing Ex. 1036 ¶ 63); *see also id.* at 24–26. Specifically, Petitioner argues that not all checks include handwritten text and, even if there is handwriting, OCRing handwriting is only a little more difficult than printed text. *Id.* at 24–26 (citing Ex. 1003, 4:66–5:2; Ex. 1037, 126:8–19, 131:1–4, 131:17–136:16; Ex. 1048, Fig. 8; Ex. 1049, Fig. 1, 4:42, 4:49–50; Ex. 1051, 770; Ex. 2105, 2; Ex. 1036 ¶ 64–57). Petitioner further argues that MICR characters used on checks were designed to be easily recognized by OCR systems. *Id.* at 26 (citing Ex. 1050, 1:22–32, 5:61–64; Ex. 1037, 139:14–140:0; Ex. 1036 ¶ 68).

Fifth, Petitioner argues there is no inconsistency between it arguing in the Texas case that the claims were not enabled while arguing in this proceeding the claims were unpatentable as obvious. Pet. Reply 26–27. According to Petitioner, "a claim may be both obvious and not enabled." *Id.* at 26 (citing *Par Pharm., Inc. v. TWi Pharms., Inc.*, 120 F. Supp. 3d 468, 479 (D. Md. 2015)); *see also id.* 27–28 (arguing whether the full scope of a claim is enabled is different from whether a single embodiment is obvious in some environments (citing *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 963 (Fed. Cir. 2014)). Petitioner further argues that "Dr. Creusere refused to state that Acharya/Luo would not work." *Id.* at 27 (citing Ex. 1037, 49:16–50:10).

(2) Patent Owner's Arguments

Patent Owner argues that Luo does not teach or suggest "computerreadable instructions for depositing a check," which requires "providing a check to a depository in a form sufficient to allow money to be credited to an

²⁶ OCR refers to optical character recognition.

IPR2021-01073 Patent 8,977,571 B1

account," and also capturing check images when "the image of the check passes the monitoring criterion," as recited in claim 1. *See* PO Resp. 35–45 (emphasis omitted).

First, Patent Owner argues that "determining that edges of a check align substantially with reference lines is not the same as determining that check data can be electronically obtained from the image without error during electronic processing and clearing (which is what the claim construction requires)." PO Resp. 36. Instead, according to Patent Owner, a person having ordinary skill in the art would have been aware of many different factors that may affect the quality of an image. *Id.* at 36–37 (citing Ex. 1016 ¶ 58–62; Ex. 2115 ¶ 28). Patent Owner further argues that, although Petitioner argues that Acharya teaches the preamble, Petitioner does not explain how the combination of Acharya and Luo—which replaces Acharya's manual capture with Luo's automatic capture with reference lines—teaches the limitation. *Id.* at 37–38 (citing Ex. 2122, 42; Ex. 2123, 17:8–25, 56:13–60:14).

Patent Owner also argues that Petitioner's arguments are inconsistent with positions taken in the Texas case. PO Resp. 38–39. Specifically, Patent Owner argues, "Petitioner told the [Texas] court 'alignment with a guide is not, by itself, sufficient for a check to be of sufficiently high quality to be deposited' and thus '[m]eeting the "deposit" requirement of the claims [] would have required identifying *additional monitoring criteria* to ensure that the check image is in a form suitable for deposit." *Id.* at 38 (quoting Ex. 2111, 17) (first alteration added) (other alterations is in original). Patent Owner further argues that "Petitioner's expert in the district court litigation, Dr. Kia, has similarly opined that 'ensuring alignment with an alignment guide does not suffice to render the check image usable for deposit' as

IPR2021-01073 Patent 8,977,571 B1

'numerous other criteria besides alignment must be met before a check image would be depositable." *Id.* at 39 (citing Ex. $2120 \, \P \, 140$); *see also id.* at 39–40 (citing Ex. $2120 \, \P \, 141$, 147 (citing additional expert testimony)).

Second, Patent Owner argues Petitioner does not address the purported differences between OCR performed on business cards and OCR performed to extract data from checks. PO Resp. 40–45; *see also id.* at 41–43 (describing the differences between business cards and checks). Specifically, Patent Owner argues that, "[a]t the time of the invention, OCR of handwriting or non-standard fonts was considered much more challenging than recognition of basic text of the type one would find on a business card." *Id.* at 43 (citing Ex. 2105; Ex. 2106; Ex. 2115 ¶ 29). Moreover, according to Patent Owner, prior art systems struggled to OCR business card information. *Id.* at 44 (citing Ex. 2121, 14:23–17:11, 20:8–19, 29:16–33:8, 37:9–22).

(3) Our Analysis

Acharya teaches that RCT memory 104 may be any of a wide variety of media, including "a hard disk, a floppy disk, an optical disk, a magnetic tape, a [random-access memory], a [read-only memory], a [programmable read-only memory], an [erasable programmable read-only memory]." Ex. 1003, 4:53–62. Acharya further teaches that "[c]ertain instructions may also be stored in RCT memory 104 and executed by the CPU 103." *Id.* at 4:63–65. Accordingly, Acharya teaches "a non-transitory computer-readable medium comprising computer-readable instructions . . . that, when executed by a processor, cause the processor to" perform certain tasks, including, as discussed below, the tasks set for in limitations [1a]–[1c]. We note that Patent Owner does not dispute that Acharya teaches that portion of the preamble.

IPR2021-01073 Patent 8,977,571 B1

Acharya further teaches "deposit[ing] a financial instrument, such as a third party paper check, using a Remote Customer Terminal (RCT)." Ex. 1003, 2:45–48; *see also id.* at 1:17–22 ("The invention relates generally to a system and method for initiating a deposit transaction . . . e.g. a paper check."). Accordingly, Acharya teaches its computer readable instructions can be used "for depositing a check" as recited in claim 1.

The combination of Acharya and Luo further teaches that the software causes the processor to "[1b] capture the image of the check with the camera when the image of the check passes the monitoring criterion" as recited in claim 1. Specifically, Acharya teaches that a banking customer can use the RCT to capture the image of a paper check by a digital camera. Ex. 1002 ¶ 108; Ex. 1003, 3:11–14 (teaching capturing the image of a financial instrument using a digital camera), 1:18–26 (describing a paper check as a type of financial instrument). Additionally, Luo teaches using reference lines to determine when to automatically capture the image of an object. Ex. 1004, 8 ("the system 100 provides the user with an image of a captured object"), 9 ("[W]hen the straight edge 205 displayed on the preview window 125 is substantially parallel to the corresponding reference line 135, the system 100 can automatically capture the selected image and provide the user with or without instructions."). That is, a person having ordinary skill in the art would have understood that Luo teaches automatically capturing an image "at or after the moment the image of the [document in the field of view]" is "substantially parallel to the corresponding reference line." Ex. 1002 ¶¶ 109–111. When Luo's teaching is applied to Acharya's system, a person having ordinary skill in the art would have understood that aligning the image of a check in the reference lines reduces projective distortion and reduces blur. Id. $\P\P$ 76, 112. This allows for the capture of "well-focused

IPR2021-01073 Patent 8,977,571 B1

and clear document images" to make "the optical character recognition of any text printed in the document effective and reliable." Ex. 1004, 7. Accordingly, a person having ordinary skill in the art would have understood that the combination of Acharya and Luo teaches "capture the image of the check with the camera when the image of the check passes the monitoring criterion" as recited in claim 1.

We do not agree with Patent Owner's arguments regarding these limitations. For example, although we agree with Patent Owner that the combination of Acharya and Luo will not eliminate all potential defects that would prevent an image from being used to deposit of check, Patent Owner's argument is inapposite. So long as the image of the check is sufficient to be deposited at least some of the time, the claims are obvious. *Unwired*, 841 F.3d at 1002 ("[C]ombinations of prior art that sometimes meet the claim elements are sufficient to show obviousness."); *Hewlett*– Packard, 340 F.3d at 1326 ("[A] prior art product that sometimes, but not always, embodies a claimed method nonetheless teaches that aspect of the invention."). That is consistent with '571 patent, which states that use of image monitoring criteria is "[t]o increase the likelihood of capturing a digital image of the check 108 that may be readable and processed such that the check 108 can be cleared." Ex. 1001, 3:54–58. Thus, while there may be other defects that can appear in the check image that using reference guides will not prevent (see PO Resp. 36–38), all that matters for our analysis is that a sufficient check image is sometimes produced.²⁷ Petitioner

For that reason, it does not matter that a witness was unable to use a contemporary OCR program to correctly read a business card. *See* PO Resp. 44. The issue is not whether the program is 100% effective, but whether it is sometimes effective. Patent Owner does not contend that Luo is not

IPR2021-01073 Patent 8,977,571 B1

has presented sufficient testimony that will happen. See Ex. 1002 ¶¶ 72–84; Ex. 1036 ¶ 57.

Similarly, we disagree with Patent Owner's argument that claim 1 requires multiple criteria to ensure that the check can be deposited. *See* PO Resp. 38–40. First, Patent Owner's argument is inconsistent with the words of the claim which use the singular "monitoring criterion." Ex. 1001, 21:13–14. This was confirmed by Patent Owner's expert, Dr. Creusere. *See* Ex. 1037, 40:9–41:2; 52:22–53:10, 57:22–58:14.

Second, the argument is also inconsistent with the prosecution history of the '571 patent. During prosecution, the applicant changed the pending claims from a plurality of monitoring criteria to the singular criterion: "plurality of monitoring criterion eriteria." Ex. 1007, 93²⁸; see also Ex. 1036 ¶ 58. Because the applicant affirmatively changed the claims during prosecution, we do not now add back a requirement of a plurality of criteria.

Third, we do not find Dr. Kia's testimony from the Texas case particularly relevant or of any assistance in this proceeding. *See* PO Resp. 39–40. The issue Dr. Kia testified about was enablement, not obviousness. *See* Ex. 1047 ¶¶ 143, 147; Ex. 2111. The issue of whether the full scope of the claims is enabled is distinct from whether the prior art combination teaches an embodiment of the claims and nothing prevents a patent claim

enabled. See In re Antor Media Corp., 689 F.3d 1282, 1287–1288 (Fed. Cir. 2012); Apple Inc. v. Corephotonics, Ltd., 861 F. App'x 443, 450 (Fed. Cir. 2021) (nonprecedential) ("[R]egardless of the forum, prior art patents and publications enjoy a presumption of enablement, and the patentee/applicant has the burden to prove non-enablement for such prior art.").

²⁸ All citations are to the pagination added to Exhibit 1007.

IPR2021-01073 Patent 8,977,571 B1

from being both not enabled and obvious. *See Par Pharm.*, 120 F. Supp. 3d at 479 (finding claims both obvious and enabled). And Dr. Kia is not a witness in this case. Although testimony by a testifying expert in a different proceeding might be relevant for cross-examination, we see little, if any, relevance by the testimony of a person who is not a witness in this proceeding regarding an issue that is not present in this proceeding. Accordingly, we give Dr. Kia's testimony regarding enablement from the Texas case no weight in this proceeding.

Moreover, as Patent Owner conceded at Oral Hearing, during the Texas case, an expert testified on behalf of Patent Owner that the claims were enabled and the jury found the claims enabled. Tr. 46:3–47:18. Having succeeded during the Texas case, if one of the parties should be prevented for taking inconsistent positions, it is Patent Owner. *See New Hampshire v. Maine*, 532 U.S. 742 (2001). But, as discussed above, the issues are different so neither party is estopped and the expert testimony in the Texas case—whether proffered by the successful Patent Owner or the unsuccessful Petitioner—is inapposite here.

We also disagree with Patent Owner's argument regarding issues associated with OCR performed on checks versus business cards. *See* PO Resp. 40–44. As Patent Owner points out, unlike business cards which are printed in text, some checks have a mixture of printed text, handwritten numbers and letters, and magnetic-ink characters. *See* Ex. 2104. However, not all checks have handwriting; "some checks are entirely computer printed." Ex. 1037, 131:1–4; *see also* Ex. 1048, Fig. 8 (published patent application showing a printed check); Ex. 1049, Fig. 1 (patent showing a printed check). Moreover, to the extent that a check includes handwriting, Patent Owner's expert agreed that handwritten text is only "a little more

IPR2021-01073 Patent 8,977,571 B1

difficult" than printed text to recognize using OCR. Ex. 1037, 132:15–133:13.

Nor does the evidence show that there would be an issue OCRing MICR characters. See PO Resp. 37–38. MICR characters were printed in font E13B, which was "designed to be easily recognized by . . . optical character recognition systems." Ex. 1050, 1:22–32, 5:61–64; Ex. 1036 \P 68. Thus, it would not have been especially difficult to OCR the MICR characters. See Ex. 1036 \P 68.

Accordingly, for the reasons discussed above, we find that Petitioner has sufficiently shown that Acharya teaches the preamble and the combination of Acharya and Luo teach limitation [1b].

- c) Image Monitoring and Capture Module
 - (1) Petitioner's Argument

Claim 1 further recites that the instructions cause the processor to "[1a] monitor an image of the check in a field of view of a camera of a mobile device with respect to a monitoring criterion using an image monitoring and capture module of the mobile device." Ex. 1001, 21:9–12. Petitioner argues that the combination of Acharya and Luo teaches this limitation. Pet. 43–53. Specifically, as discussed in more detail below, Petitioner argues that Luo teaches all of the elements of the limitation, except for "the check," which is taught by Acharya. *Id*.

Petitioner argues that Luo teaches "monitor[ing] an image of the [object]." Pet. 43–45. Specifically, Petitioner argues the, because Luo captures an image of a business card only when the edges of the business card are substantially parallel with reference lines 135, "Luo's system monitors the image in the preview window 125." *Id*.

IPR2021-01073 Patent 8,977,571 B1

Petitioner also argues that Luo teaches that the monitoring is done "with respect to a monitoring criterion." Pet. 45–49. Specifically, Petitioner argues that

Luo teaches monitoring whether a "straight edge 205" of an object whose image is being "displayed in the preview window 125 is substantially parallel to the corresponding reference line 135" and "only when the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135 can the image of the object be captured."

Id. at 46 (quoting Ex. 1004, 10). According to Petitioner, alignment with the reference lines is a "monitoring criterion." *Id.* at 46–49.

Petitioner also argues that Luo teaches that the "image" is "monitor[ed]... in a field of view of a camera of a mobile device." Pet. 49–51. Specifically, Petitioner argues that Luo teaches a camera system with image sensor 115 adapted to receive an image and a preview window that functions as a viewfinder to display the image in real time. *Id*.

Petitioner also argues that Luo teaches "using an image monitoring and capture module." Pet. 51–52. Specifically, Petitioner argues that Luo teaches that image sensor 115 may "contain conventional lenses and optics, as well as digital image sensors, such as a charge coupled device (CCD) sensor, a CMOS [complementary metal oxide semiconductor] sensor, and so on." *Id.* at 51 (emphasis omitted) (quoting Ex. 1004, 6). Petitioner further argues that "Luo teaches that 'the embodiments described herein may consist of one or more conventional processors and uniquely stored program instructions that control the operation of one or more processors." *Id.* (quoting Ex. 1004, 11). According to Petitioner, a person having ordinary skill in the art would "have recognized that the implementation details taught by Luo would apply to Acharya's 'digital camera' RCT (EX1003, 4:18–20)

IPR2021-01073 Patent 8,977,571 B1

as instructions (i.e., software) stored in memory and executed by the CPU 103." *Id.* at 51-52 (citing Ex. $1002 \, \P \, 104$).

Petitioner also argues that Acharya teaches capturing the image of a "check." Pet. 52–53. According to Petitioner, a person having ordinary skill in the art "would have found it obvious to combine Acharya and Luo to 'monitor an image of the check." *Id.* at 52 (citing Ex. $1002 \, \P \, 105$).

Petitioner also argues that, even if the "image monitoring and capture module" is a means-plus-function limitation, that does not change the obviousness analysis. *See* Pet. Reply 14–16. Specifically, Petitioner argues that the Petition (at pages 51–52) maps the "image and monitoring capture module" to a camera, a mobile device, and software. *Id.* at 15 (citing Ex. 1004, 4 (mobile device), 6 (camera), 11 (software)).²⁹

(2) Patent Owner's Arguments

Patent Owner argues that Luo does not teach a camera or software that accesses and monitors live video frames: "Petitioner does not identify structure disclosed in Luo consisting of a digital camera, a mobile device operating system that can access live video frames from the camera via APIs, and software that can monitor these frames and determine when to automatically capture the check image." PO Resp. 32 (emphases added). According to Patent Owner, the identification of a processor, software, and a camera is insufficient. *Id.* at 33; see also PO Sur-reply 1–2 ("In contrast, as the district court stated in its claim construction order, 'the "image

²⁹ Petitioner also argues that Luo teaches the limitation under Patent Owner's proposed additional structure. *See* Pet. Reply 16–18. Because we did not adopt those additional structures in our claim construction, we do not address Petitioner's arguments or Patent Owner's responsive arguments in the Sur-reply.

IPR2021-01073 Patent 8,977,571 B1

monitoring and capture module 456" is not a general purpose computer but rather is a *particular disclosed software structure*." (Citing Ex. 1034, 65)).

Patent Owner also argues that "Luo's system is not implemented via a mobile operating system." PO Resp. 33. Specifically, Patent Owner argues that

Luo does not teach that its system is implemented using a mobile device's mobile operating system or employing any of the structures described in the '571 patent specification; nor is it necessary to employ a mobile operating system to analyze check images or preview video frames using a camera system.

Id. at 34 (citing Ex. 2116, 62:25–63:11); *see also* PO Sur-reply 4 ("Luo does not describe control software separate from the camera.").

(3) Our Analysis

Luo teaches "monitor[ing] an image of the check in a field of view of a camera of a mobile device with respect to a monitoring criterion" as recited in limitation [1a]. Specifically, Luo teaches "an improved method and system for capturing the frontal image of an object having at least two substantially straight edges 205." Ex. 1004, 10. "[S]ystem 100 provides the user with an image of a captured object, such as a business card, only when the straight edge 205 of the business card is substantially parallel to the corresponding reference line 135 displayed in the preview window 125." *Id.* at 8. "The reference line 135 is used to guide the user of the system 100 to position the image sensor 115 in an appropriate orientation with respect to, for example, a business card object." *Id.* at 7. When the straight edges of the object are substantially parallel to the reference lines 135, the camera automatically takes a picture. *Id.* at 8–9; Ex. 1002 ¶ 92. The reference lines 135 act as a monitoring criterion that are used to determine when an object is in the correct position in the field of view of the camera in order to

IPR2021-01073 Patent 8,977,571 B1

prevent projective distortion. *See* Ex. 1004, 8, 10; Ex. 1002 ¶¶ 93–96, 100–103. We note that the '571 patent describes an alignment guide as an example of monitoring criterion: "[i]n an implementation, the positioning of the check 108 in the image 230 may be compared with an alignment guide." Ex. 1001, 7:38–48; *see also* Ex. 1002 ¶¶ 98–99 (describing the similarity between Luo and the '571 patent's alignment guide). Patent Owner does not contest that Luo teaches these features. *See* PO Resp.

We further find that the combination of Luo and Acharya teaches using Luo's system on a check. As discussed above, a person having ordinary skill in the art would have used Luo's reference lines to improve Acharya's ability to take pictures of checks. *See* section II.D.3.a, *infra*. Because Acharya teaches capturing the image of a check, a person having ordinary skill in the art would have used the combination of Acharya and Luo to capture the images of checks and to make sure that the images pass the monitoring criterion. *See* Ex. 1002 ¶¶ 105–106. Although, Patent Owner challenges whether the combination would have been made, Patent Owner does not dispute that the combination of Acharya and Luo, if made, would capture the image of a check. *See* PO Resp.

We further find that Acharya teaches "using an image monitoring and capture module" as recited in limitation [1a]. Specifically, Luo teaches "a camera housing 105 incorporating . . . an image sensor 115 adapted to receive an image," where the image sensor may "contain conventional lenses and optics, as well as digital image sensors, such as a charge coupled device (CCD) sensor, a CMOS sensor, and so on." Ex. 1004, 6. That is, Luo teaches using a camera. See id.; Ex. 1002 ¶ 104; Ex. 1036 ¶ 44. Luo further teaches that "the embodiments described herein may consist of one or more conventional processors and uniquely stored program instructions that

IPR2021-01073 Patent 8,977,571 B1

control the operation of one or more processors." Ex. 1004, 11. A person having ordinary skill in the art would have recognized those instructions as software that are stored in memory and executed by the processor. *See* Ex. 1002 ¶ 104; Ex. 1036 ¶ 44. Stated differently, Petitioner has sufficiently shown that the combination of Luo and Acharya teaches a processor executing software to monitor the image of a check in the viewscreen of a camera to determine whether the check meets a criterion (having the edges of the check parallel to a reference guide), and then automatically capturing the image once that criterion has been met. That is, consistent with our claim construction analysis above, those elements provide for the function of image monitoring and capture. *See* Section II.C.2, *supra*.

We do not agree with Patent Owner's arguments which are directed to Patent Owner's proposed identification of recited structure for the claimed "image monitoring and capture module," which we do not agree with. *See* PO Resp. 32–34.

Accordingly, Petitioner sufficiently shows that the combination of Acharya and Luo teaches a processor which will "monitor an image of the check in a field of view of a camera of a mobile device with respect to a monitoring criterion using an image monitoring and capture module of the mobile device" as recited in claim 1.

d) Providing the Image

Claim 1 further recites that the instructions cause the processor to "[1c] provide the image of the check from the camera to a depository via a communication pathway between the mobile device and the depository." Ex. 1001, 21:15–17. Petitioner argues that Acharya teaches this limitation. Pet. 55–57. Specifically, Petitioner argues RCT 100 communicates with BOFD system 100, a depository, via a direct communication link 120. *Id.*

IPR2021-01073 Patent 8,977,571 B1

at 55–56. Petitioner also argues that a person having ordinary skill in the art would have understood that RCT 100 sends a copy of the check over communication link 120 to BOFD system 110. *Id.* at 56–57.

Based on the undisputed evidence and reasons set forth in the Petition, including Dr. Mowry's testimony, which are not addressed by Patent Owner (*see* PO Resp.), we find that Acharya teaches this limitation.

e) Conclusion Regarding Claim 1

We have considered the evidence submitted by the parties and determine that Petitioner has shown by a preponderance of the evidence that claim 1 of the '571 patent would have been obvious over Acharya and Luo.

4. Analysis of Claims 2, 3, 6, 9, 10, and 13

Petitioner argues that the combination of Acharya and Luo teaches the additional limitations recited in claims 2, 3, 6, 9, 10, and 13, and that a person having ordinary skill in the art would have combined the teachings of the two references with a reasonable expectation of success. *See* Pet. 58–73.

Besides the challenges discussed above with regard to claim 1, Patent Owner does not dispute in this proceeding Petitioner's argument regarding dependent claim 2, 3, 6, 9, 10, and 13. *See* PO Resp.

Based on the evidence and arguments presented in the Petition, which are not otherwise argued by Patent Owner, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 2, 3, 6, 9, 10, and 13 would have been obvious over the combined teachings of Acharya and Luo.

E. Obviousness over Acharya, Luo, and Nepomniachtchi

Petitioner argues that claims 4 and 5 would have been obvious over Acharya, Luo, and Nepomniachtchi. Pet. 73–78. For the reasons discussed

IPR2021-01073 Patent 8,977,571 B1

below, Petitioner has shown by a preponderance of the evidence that claims 4 and 5 are unpatentable.

1. Nepomniachtchi

Nepomniachtchi is entitled "System for Mobile Imaging Capture and Processing of Documents" and is directed "to systems and methods for document image processing that enhances an image for data extraction from images captured on a mobile device with camera capabilities." Ex. 1016, code (54), ¶ 2. Relevant to this proceeding, Nepomniachtchi recites prompting the user to take a picture of both the front and back of a check. *Id.* ¶ 78. Nepomniachtchi also recites prompting the user to take a second picture if the image quality is determined to be poor. *Id.* ¶ 62.

2. Analysis of Claims 4 and 5

Petitioner argues that the combination of Acharya, Luo, and Nepomniachtchi teaches the additional limitations recited in claims 4 and 5, and that a person having ordinary skill in the art would have combined the teachings with a reasonable expectation of success. *See* Pet. 73–78.

Based on the evidence and arguments presented in the Petition, which are not separately argued by Patent Owner (*see* PO Resp.), we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 4 and 5 would have been obvious over the combined teachings of Acharya, Luo, and Nepomniachtchi.

F. Obviousness over Acharya, Luo, and Yoon

Petitioner argues that claim 12 would have been obvious over Acharya, Luo, and Yoon. Pet. 78–83. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claim 12 is unpatentable.

IPR2021-01073 Patent 8,977,571 B1

1. Yoon

Yoon is entitled "Apparatus and Method for Photographing a Business Card in Portable Terminal" and is directed "to an apparatus and method for allowing a business card to be automatically photographed by detecting the boundary lines of the business card." Ex. 1005, code (54), \P 3. Relevant to this proceeding, Yoon recites that image brightness is one of the unideal variable factors that can lower the "probability of satisfactorily recognizing the business card" in order to obtain the information contained in the business card. *Id.* \P 7. Yoon addresses this issue by monitoring image brightness when an image is captured by a terminal. *See id.* at Fig. 2.

2. Analysis of Claim 12

Petitioner argues that the combination of Acharya, Luo, and Yoon, teaches the additional limitations recited in claim 12, and that a person having ordinary skill in the art would have combined the teachings with a reasonable expectation of success. *See* Pet. 78–83.

Based on the evidence and arguments presented in the Petition, which are not separately argued by Patent Owner (*see* PO Resp.), we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 12 would have been obvious over the combined teachings of Acharya, Luo, and Yoon.

G. Patent Owner's Motion to Exclude

1. Exhibits 1053, 1054, and 1055

Patent Owner argues that Exhibits 1053–1055, which it describes as web page printouts of articles from a website called "Mobile Gazette" regarding the "Toshiba Portege G910 / G920," "i-Mate Ultimate 9502," and "Sony Ericsson XPERIA X1," respectively, are hearsay under Federal Rule of Evidence 802 and no hearsay exception applies. Mot. Exclude 1–3.

IPR2021-01073 Patent 8,977,571 B1

Petitioner argues that there is no dispute that the exhibits are authentic, the exhibits are probative, and the exhibits were relied upon and cited by Dr. Mowry in his testimony. Opp. Exclude 2–5.

In its Reply, Patent Owner argues that, although "an expert is entitled to rely on inadmissible evidence in reaching his or her opinions, an expert's citation to hearsay does not render the underlying information admissible, nor does relevance substitute for admissibility under the Federal Rules." Reply Exclude 1 (citing *Unified Patents Inc. v. American Patents LLC*, IPR2019-00482, Paper 132, at 53 (PTAB Aug. 3, 2022)).

We are persuaded that Exhibits 1053–1055 are admissible.

First, the exhibits are not hearsay. A statement is hearsay if it is one "the declarant does not make while testifying at the current trial or hearing" and "a party offers in evidence to prove the truth of the matter asserted in the statement." Fed. R. Evid. 801(c) (emphasis added). In this case, Exhibits 1053–1055 are not offered to prove the truth of the matter asserted in these prior art articles; instead the exhibits are offered for the fact that their contents were in the prior art and available to those of ordinary skill in the art. See, e.g., Joy Techs., Inc. v. Manbeck, 751 F. Supp. 225, 233 n.2 (D.D.C. 1990), aff'd, 959 F.2d 226 (Fed. Cir. 1992) ("A prior art document submitted as a 'printed publication' . . . is offered simply as evidence of what it describes, not for proving the truth of the matters addressed in the document. Therefore, it is not hearsay under Fed.R.Evid. 801(c)."). It does not matter whether the statements in the exhibits are true; what is relevant for our analysis is what was stated in the exhibits during the operative time

With some exceptions that do not apply here, the Federal Rules of Evidence apply to this proceeding. 37 C.F.R. § 42.62(a), (b).

IPR2021-01073 Patent 8,977,571 B1

period. See Ries Biologicals, Inc. v. Bank of Santa Fe, 780 F.2d 888, 890 (10th Cir. 1986) (statements offered not for their truth or falsity, but for the fact that they were made, are for a non-hearsay purpose).

Second, even if the exhibits were hearsay, they are still admissible. As an expert, Dr. Mowry may base his opinion "on facts or data in the case that the expert has been made aware of" and such sources "need not be admissible for the opinion to be admitted." Fed. R. Evid. 703. Patent Owner has not filed a motion to exclude Dr. Mowry's testimony based on those exhibits. *See* Mot. Exclude. Thus, Dr. Mowry's testimony relying on Exhibits 1053–1055 has been properly admitted. This includes quotes from the documents. *See* Ex. 1036¶30.

An expert relying on evidence is not, by itself, sufficient for the admission of the evidence. Instead, if the evidence is otherwise inadmissible, such as hearsay, the evidence may only be admitted "if their probative value in helping the [fact finder] evaluate the opinion substantially outweighs their prejudicial effect." Fed. R. Evid. 703. On one hand, to the extent we consider the portions of Dr. Mowry's testimony quoting Exhibits 1053–1055, having the underlying exhibits is helpful to judge Dr. Mowry's credibility. On the other hand, Patent Owner has not identified any prejudice associated with the admission of the exhibits. *See* Mot. Exclude. Indeed, whether we admit or exclude the exhibits, the relevant language is quoted in Dr. Mowry's testimony and in the record, minimizing any potential prejudice. Thus, the probative value of the exhibits that are quoted in admissible testimony substantially outweighs the unidentified prejudice.

Accordingly, Patent Owner's motion to exclude Exhibits 1053–1055 is *denied*.

IPR2021-01073 Patent 8,977,571 B1

2. Exhibits 1047 and 1056

Patent Owner argues that Exhibits 1047 and 1056 are "excerpts of an expert report of Dr. Omid Kia, served by Petitioner in [the Texas case]." Mot. Exclude 3. Patent Owner argues that both the exhibits are hearsay under Federal Rule of Evidence 802 and, only with regard to Exhibit 1056, this exhibit is irrelevant under Federal Rules of Evidence 401 and 402 because it is not cited in a brief. *Id.* at 3–4.

Patent Owner also argues that, although Dr. Kia's testimony is not hearsay when offered by Patent Owner, it is when offered by Petitioner. Reply Exclude 2–3. Patent Owner also argues that Petitioner argues in a different IPR proceeding that that uncited exhibits should be excluded. *Id.* at 3–5.

Petitioner argues Patent Owner has already "submitted its own excerpts from Dr. Kia's expert report in this proceeding." Opp. Exclude 5. Petitioner further argues that it did not offer the reports for the truth of the matter asserted, but "instead to show that Patent Owner's selective citations to Dr. Kia's opinions, when viewed in a fuller context, do not conflict with Petitioner's positions in this IPR." *Id.*; *see also id.* at 6–7 (arguing that even though Petitioner did not cite Exhibit 1056, "it provides the Board with the necessary context for Dr. Kia's opinions.").

Federal Rule of Evidence 106 provides that, "[i]f a party introduces all or part of a writing or recorded statement, an adverse party may require the introduction, at that time, of any other part — or any other writing or recorded statement — that in fairness ought to be considered at the same time." Exhibits 1047 and 1056 are portions of the same expert reports as Exhibits 2016 and 2120, respectively, and Exhibits 2016 and 2120 are in the record. Because having more complete copies of the expert report helps us

IPR2021-01073 Patent 8,977,571 B1

determine the relevance, if any, of Dr. Kia's testimony, Federal Rule of Evidence 106 supports our admission of Exhibits 1047 and 1056.

The fact that Exhibit 1056 is not cited in the Petition or Reply does not require us to exclude it. Exhibits 1056 and 2120 are, effectively, the same exhibit and Exhibit 2120 was cited in Patent Owner's Sur-reply. *See* PO Sur-reply 18. Because a portion of the expert report (Exhibit 2120) was cited in a paper, it is appropriate for use to consider any portion of the expert report, including the portion found in Exhibit 1056.

Accordingly, Patent Owner's motion to exclude Exhibits 1047 and 1056 is *denied*.

- H. Patent Owner's Motion to File Supplemental Information
 - 1. The Parties' Arguments

Patent Owner filed a motion to file two post-trial briefs filed in the Texas case as supplemental information. *See* Mot. SI, Exs. A and B. The first is a brief filed by Petitioner and the second is one filed by Patent Owner. *Id*.

First, Patent Owner argues that Petitioner argues in the Texas case, relying on the testimony of Dr. Kia, that the claims of the '571 patent are not enabled. *Id.* at 1–3. Second, Patent Owner argues that Petitioner is advancing an argument in the Texas case regarding the "image monitoring and capture module" recited in claims 1 and 9 of the '571 patent that is inconsistent with the position Petitioner takes in this proceeding. *Id.* at 3–4. Third, Patent Owner argues that the evidence could not have been obtained earlier and the admitting evidence of inconsistent statements is in the interest of justice. *Id.* at 5.

Petitioner argues that the information is of minimal relevance.

Opp. SI 1–4. First, Petitioner argues, because the '571 patent claims can be

IPR2021-01073 Patent 8,977,571 B1

both not enabled and obvious, there is no inconsistency. *Id.* at 1–2. Second, Petitioner argues that there is nothing inconsistent with arguing that the "image monitoring and capture module" recited in claims 1 and 9 of the '571 patent is both indefinite in the Texas case and obvious in this proceeding. *Id.* at 2–4.

Third, Petitioner argues that admitting the briefs after the oral hearing is not in the interest of justice. Opp. SI 4–5. With regard to whether the information could have been obtained earlier, Petitioner argues that although the briefs were filed after the oral hearing, Patent Owner has not shown that "the *information* is different from information USAA had in its possession earlier." *Id.* at 5.

2. Our Analysis

The submission of supplemental information is governed by Rule 42.123(a), which prescribes timeliness and relevance requirements. 37 C.F.R. § 42.123(b). Rule 42.123(b) does not, however, preclude consideration of additional criteria beyond timing and relevance and does not prohibit the Board from exercising its discretion to grant or deny motions. *See Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 443, 446–47 (Fed. Cir. 2015). Nor does Rule 42.123(b) exclude the application of other regulations governing Board proceedings. *Id.* at 446–47 (holding the Board did not abuse its discretion by not allowing Petitioner to submit an expert declaration and other exhibits as supplemental information).

Having reviewed the parties briefs and the proposed supplemental information, we *deny* Patent Owner's motion.

First, the evidence is of marginal, if any, relevance. Patent Owner has already offered Dr. Kia's testimony into evidence. *See* Ex. 2016; Ex. 2120.

IPR2021-01073 Patent 8,977,571 B1

Petitioner's arguments regarding that testimony adds nothing to the record. Moreover, as discussed above, there is nothing inconsistent with arguing that the full scope of a claim is not enabled by the specification of a patent while, at the same time, arguing that it would have been obvious to make an embodiment of that claim. *See* Section II.D.3.b.(3).

As for the briefing regarding the scope of the "image monitoring and capture module" recited in claims 1 and 9 of the '571 patent, we do not see any relevance to Petitioner's arguments in the attached motion to the issues in this proceeding. In its post-trial motion, Petitioner did no more than argue that Patent Owner's expert's testimony was conclusory and lacked sufficient explanation:

[Patent Owner's] lengthy block-quote of Dr. Conte's testimony (Opp. 7) nowhere explains what structure in the specification corresponds to the means-plus-function term "image monitoring and capture module," nor does it explain how the camera and software in [Petitioner's] system are identical or equivalent to any such structure in the specification. Rather, Dr. Conte simply testified in conclusory fashion that [Petitioner's] system had software that controls the camera and causes it to monitor video frames. Mot. 10–11. [Patent Owner] cannot get around its failure of proof by simply quoting and adding bold-face type to that conclusory testimony. Opp. 7.

Mot. SI, Ex. A, 2 (emphases added). Whether Patent Owner's arguments in the Texas case—which are not part of the record in this proceeding³¹—are

Indeed, Patent Owner's selective and partial production of material from the Texas case has been less than helpful. Any probative value it might have is substantially outweighed by the partial production. *Cf.* Fed. R. Evid. 403 ("The court may exclude relevant evidence if its probative value is substantially outweighed by a danger of one or more of the following: unfair prejudice, confusing the issues, misleading the jury, undue delay, wasting time, or needlessly presenting cumulative evidence."). Without the entirety of the record, including the positions taken by Patent Owner and its experts,

IPR2021-01073 Patent 8,977,571 B1

sufficient have no bearing on whether Petitioner has met its burden in this proceeding.

Weighed against that, at best, marginal relevance, is the timing of the motion. Patent Owner requested permission to file its motion on November 28, 2022, more than a month after the oral hearing. Ex. 3003. Although the specific briefs may not have been available prior to that date, Patent Owner has not shown that the same information—such as the testimony cited in the papers—were not available at an earlier date. To the contrary, the underlying trial record was available months earlier. *See* Ex. 2124 (Dr. Kia's trial testimony dated May 12, 2022); Paper 54 (admitting Dr. Kia's trial testimony as supplemental information). And, we already have multiple expert reports from Dr. Kia discussing enablement. *See* Ex. 2016; Ex. 2120.

Patent Owner has not requested supplemental briefing. As Patent Owner argues with respect to the Motion to Exclude—briefing that preceded the Motion to File Supplement Information—it is prejudicial to admit evidence when a party does not have an opportunity to address the evidence in briefing or at oral argument. *See* Reply Exclude 5 ("But in any event, admitting Exhibit 1056 would be prejudicial to Patent Owner given that Petitioner has not presented any arguments in the record regarding the exhibit, precluding Patent Owner from responding to any such arguments that Petitioner may attempt to raise (improperly) at the oral hearing or otherwise."). We are unaware of any case—and Patent Owner has not

we are unable to place the portions of the record that Patent Owner directs us to in proper context. Moreover, as discussed earlier, because Petitioner lost in the Texas case, its statements and positions do not estop it from taking different positions in this case. *See* Section II.D.3.b.(3), *infra*.

IPR2021-01073 Patent 8,977,571 B1

directed us to one—in which supplemental information was admitted after the oral hearing without supplemental briefing.

Given the minimal, if any, relevance, the earlier availability of the underlying testimony discussed in the briefs, and the prejudice associated with admitting the supplemental information when there is not sufficient opportunity for briefing addressing it, Patent Owner has not shown that admitting the supplemental information is in the interest of justice and Patent Owner's motion is *denied*.

III. CONCLUSION³²

For the foregoing reasons, we conclude that Petitioner has demonstrated by a preponderance of the evidence the unpatentability of claims 1–6, 9, 10, 12, and 13 of the '571 patent. Specifically, Petitioner has demonstrated by a preponderance of the evidence that claims 1–3, 6, 9, 10, 13 would have been obvious under 35 U.S.C. § 103(a) in light of Acharya and Luo, that claims 4 and 5 would have been obvious under 35 U.S.C. § 103(a) in light of Acharya, Luo, and Nepomniachtchi, and that claim 12 would have been obvious under 35 U.S.C. § 103(a) in light of Acharya, Luo, and Yoon.

³² Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

IPR2021-01073 Patent 8,977,571 B1

We also *deny* Patent Owner's motion to exclude Exhibits 1047, 1053, 1054, 1055, and 1056, and we *deny* Patent Owner's second motion to file supplemental information.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–6, 9, 10, 12, and 13 of the '571 patent are held unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 62) is *denied*;

FURTHER ORDERED that Petitioner's Motion to File Supplemental Information (Paper 70) is denied; and

FURTHER ORDERED that, because this Decision is a Final Written Decision, a party to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

In summary:

Claims	35	Reference(s)/Basis	Claims	Claims
	U.S.C. §		Shown	Notshown
			Unpatentable	Unpatentable
1–3, 6, 9,	103(a)	Acharya, Luo	1–3, 6, 9, 10,	
10, 13			13	
4, 5	103(a)	Acharya, Luo,	4, 5	
		Nepomniachtchi		
12	103(a)	Acharya, Luo,	12	
		Yoon		
Overall			1–6, 9, 10, 12,	
Outcome			13	

IPR2021-01073 Patent 8,977,571 B1

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Paper 68 Entered: January 19, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A., Petitioner,

v.UNITED SERVICES AUTOMOBILE ASSOCIATION,

Patent Owner.

IPR2021-01070 Patent 8,699,779 B1

Before DAVID C. McKONE, SCOTT B. HOWARD, and JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

McKONE, Administrative Patent Judge.

Final Written Decision

Determining All Challenged Claims Unpatentable

Denying Patent Owner's Motion to Exclude

35 U.S.C. § 318(a); 37 C.F.R. § 42.64(c)

IPR2021-01070 Patent 8,699,779 B1

I. INTRODUCTION

A. Background and Summary

PNC Bank N.A. ("Petitioner") filed a Petition (Paper 3, "Pet.") requesting *inter partes* review of claims 1, 2, 7–10, and 15–17 of U.S. Patent No. 8,699,779 B1 (Ex. 1001, "the '779 patent"). Pet. 3. United Services Automobile Association ("Patent Owner") filed a Preliminary Response (Paper 8). Pursuant to our authorization, Petitioner filed a Preliminary Reply (Paper 12)² and Patent Owner filed a Preliminary Sur-reply (Paper 16). Pursuant to 35 U.S.C. § 314, we instituted this proceeding. Paper 20 ("Dec."). 4

Patent Owner filed a Patent Owner's Response (Paper 40, "PO Resp."), Petitioner filed a Reply to the Patent Owner's Response (Paper 43, "Reply"), and Patent Owner filed a Sur-reply to the Reply (Paper 58, "Surreply").

Patent Owner filed a motion to exclude evidence (Paper 59, "Mot. Exclude"), Petitioner filed an opposition (Paper 61, "Opp. Exclude"), and Patent Owner filed a reply to the opposition (Paper 63, "Reply Exclude").

An oral argument was held in this proceeding and IPR2021-01073 on October 25, 2022. Paper 67 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Decision is a final written decision under 35 U.S.C. § 318(a) as to the patentability of claims 1, 2, 7–10, and 15–17. Based on the record before us, Petitioner has proved, by

¹ A public version of the Preliminary Response is filed as Paper 9.

² A public version of the Preliminary Reply is filed as Paper 14.

³ A public version of the Preliminary Sur-reply is filed as Paper 18.

⁴ A public version of the Institution Decision is filed as Paper 25.

IPR2021-01070 Patent 8,699,779 B1

a preponderance of the evidence, that claims 1, 2, 7–10, and 15–17 are unpatentable. Patent Owner's Motion to Exclude is denied as to Exhibits 1053–1055 and dismissed as moot as to Exhibit 1056.

B. Related Matters

The parties represent that Patent Owner has asserted the '779 patent, along with three other patents, in *United Services Automobile Association* v. *PNC Bank.*, N.A., No. 2:20-cv-00319-JRG (E.D. Tex.) ("the Texas case"). Pet. 3; Paper 4, 2. Patent Owner states that Mitek Systems, Inc., filed a declaratory judgement action alleging non-infringement of the '779 patent in *Mitek Systems, Inc. v. United Services Automobile Association*, No. 2:20-cv-00115-JRG (E.D. Tex.). Paper 4, 2.

The '779 patent also was challenged in *Wells Fargo Bank*, *N.A. v. United Services Automobile Association*, CBM2019-00005 (institution denied because the '779 patent is not a covered business method patent), *Wells Fargo Bank*, *N.A. v. United Services Automobile Association*,

IPR2019-01083 ("the Wells Fargo IPR") (final written decision determining no challenged claims unpatentable), and *Mitek Systems, Inc. v. United Services Automobile Association*, IPR2020-00976 (institution denied).

Pet. 4; Paper 4, 3.

C. The '779 Patent

The '779 patent describes "[a]n alignment guide [that] may be provided in the field of view of a camera associated with a mobile device used to capture an image of a check." Ex. 1001, Abstr. The invention is used in the context of the system of Figure 1, reproduced below:

IPR2021-01070 Patent 8,699,779 B1

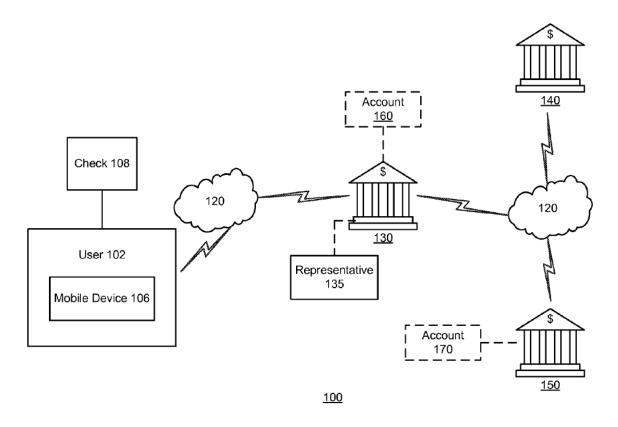


FIG. 1

Figure 1 is a block diagram of a system used to deposit a check. *Id.* at 2:6–8, 2:44–46. User 102, the entity that owns account 160 (e.g., a checking account) held at financial institution 130, deposits check 108 in account 160. *Id.* at 3:5–11. Financial institution 130 processes and/or clears check 108. *Id.* at 3:11–13. Check 108 is drawn from account 170 at financial institution 150. *Id.* at 3:24–27. According to the '779 patent,

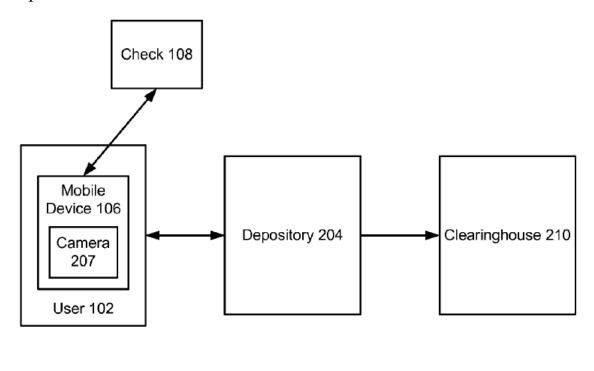
user 102 may deposit the check 108 into account 160 by making a digital image of the check 108 and sending the image file containing the digital image to financial institution 130. For example, after endorsing the check 108, the user 102 may use a mobile device 106 that comprises a camera to convert the check 108 into a digital image by taking a picture of the front and/or back of the check 108. The mobile device 106 may be a mobile phone (also known as a wireless phone or a cellular

IPR2021-01070 Patent 8,699,779 B1

phone), a personal digital assistant (PDA), or any handheld computing device, for example.

Id. at 3:43–52.

The use of mobile device 106 is shown in more detail in Figure 2, reproduced below.



<u>200</u>

<u>FIG. 2</u>

Figure 2 is a high-level block diagram of a system used to deposit a check. Ex. 1001, 2:9–10, 5:22–24. Mobile device 106 includes camera 207 that can take an image of both the front and back of check 108. *Id.* at 5:30–39. Depository 204 (e.g., the bank where user 102 has an account) receives the images of check 108 and uses clearinghouse 210 to perform check clearing operations (e.g., removing funds from the payor's account and transferring them to the user's bank). *Id.* at 5:49–62.

IPR2021-01070 Patent 8,699,779 B1

"To increase the likelihood of capturing a digital image of the check 108 that may be readable and processed such that the check 108 can be cleared, an alignment guide may be provided in the field of view of the camera of the mobile device 106." Ex. 1001, 3:55–59. Figure 3, reproduced below, illustrates an example:

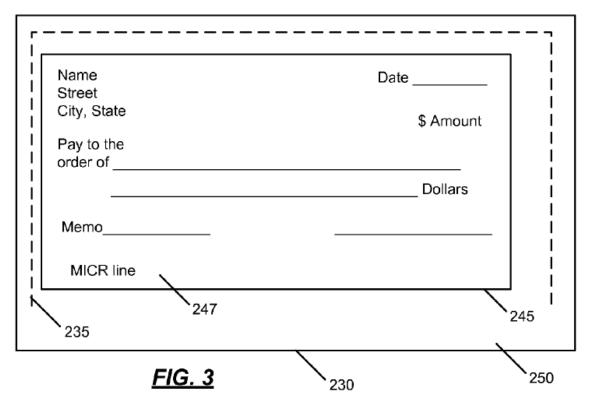


Figure 3 is a diagram of check image 247, background image 250, and alignment guide 235. *Id.* at 2:11–12, 6:1–3. Alignment guide 235 is overlaid on the camera feed of mobile device 106. *Id.* at 6:3–4. "The alignment guide 235 is provided in FIG.3 as a three sided bounding box (e.g., a rectangle in which one of the line segments or sides is removed), but any shape(s) or indicator(s) may be used, such as vertical bars, parallel lines, a circle, a square, a bounding rectangle, or a self-crop tool, for example." *Id.* at 6:5–10.

IPR2021-01070 Patent 8,699,779 B1

Image 230 is provided in the field of view of camera 207 while the user is capturing an image for check 108. Ex. 1001, 6:13–14. User 102 moves camera 207 or check 108 so that check image 247 appears within or lines up with alignment guide 235. *Id.* at 6:14–17. According to the '779 patent,

When the check image 247 is within the alignment guide 235 (e.g., the edges 245 of the check image 247 are aligned with respect to the alignment guide 235, such as parallel to the associated portion of the alignment guide 235), the check image 247 and the background image 250 (if any) that are within the alignment guide may be captured either automatically (e.g., by the camera or the mobile device under direction of an application running on the camera 207 or the mobile device 106 or the financial institution) or manually (e.g., by the user 102 pressing a button or making a selection on the camera 207 or the mobile device 106).

Id. at 6:21–31.

Claim 1, reproduced below, is illustrative of the claimed subject matter:

- 1. A system for depositing a check, comprising:
- a mobile device having a camera, a display and a processor, wherein the processor is configured to:
 - project an alignment guide in the display of the mobile device, the display of the mobile device displaying a field of view of the camera;
 - monitor an image of the check that is within the field of view;
 - determine whether the image of the check aligns with the alignment guide;
 - automatically capture the image of the check when the image of the check is determined to align with the alignment guide; and

IPR2021-01070 Patent 8,699,779 B1

transmit the captured image of the check from the camera to a depository via a communication pathway between the mobile device and the depository.

D. Evidence

Petitioner relies on the references listed below.

R	eference	Date	Exhibit No.
Acharya	US 8,768,836 B1	July 1, 2014 (filed Aug. 7, 2007)	1003
Luo ⁵	CN 1897644A	pub. Jan. 17, 2007	1004

Petitioner also relies on the Declaration of Todd Mowry, Ph.D.

(Ex. 1002, "Mowry Decl.") and the Reply Declaration of Dr. Mowry

(Ex. 1036, "Mowry Reply Decl.").

Patent Owner cites extensively to the references listed below (*see*, *e.g.*, PO Resp. 9–25):

Re	ference	Date	Exhibit No.
Yoon	US 2007/0262148A1	pub. Nov. 15, 2007	2008
Nepomniachtchi ⁶	US 2009/0185241 A1	July 23, 2009	2105

⁵ Petitioner relies on a certified translation of the Chinese application.

⁶ In the Wells Fargo IPR, the Board considered the teachings of Nepomniachtchi, US 7,778,457 B2, issued August 17, 2012 (Ex. 2012). Patent Owner contends that "The Nepomniachtchi reference discussed here is substantively identical to the Nepomniachtchi patent that was used as the base reference in the prior [Wells Fargo IPR]—both claim priority to the same provisional application—and contain similar disclosures." PO Resp. 9 n.3.

IPR2021-01070 Patent 8,699,779 B1

Re	ference	Date	Exhibit No.
ImageNet	Presentation titled "ImageNet Mobile Deposit" by Mitek Systems	June 2008	1014, pp. 30–44
Blackson	US 7,419,093 B1	Sept. 2, 2008	2113

Patent Owner also relies on the Declaration of Charles Creusere (Ex. 2115, "Creusere Decl.").

E. The Instituted Ground of Unpatentability

Petitioner asserts the following ground of unpatentability (Pet. 7):

References	35 U.S.C. §	Claims Challenged
Acharya, Luo	$103(a)^7$	1, 2, 7–10, 15–17

II. ANALYSIS

A. Claim Construction

We construe a claim:

using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

37 C.F.R. § 42.100(b) (2021); see also Phillips v. AWH Corp., 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

⁷ The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103. Because the '779 patent was filed before March 16, 2013, the effective date of the relevant amendment, the pre-AIA version of § 103 applies.

IPR2021-01070 Patent 8,699,779 B1

Petitioner (Pet. 20–22) represents that the following constructions in the table below were either agreed upon or proposed by Patent Owner in the Texas case. Additionally, as also reflected in the table below, the Texas court construed several of these claim terms in its November 22, 2021, Claim Construction Memorandum Opinion and Order (Ex. 1033):

Claim Term	Agreed Construction or Proposed by Patent Owner	Texas Court's Construction
"depositing a check" (claims 1, 10)	"providing a check to a depository in a form sufficient to allow money to be credited to an account"	
"a system for depositing a check"	The preambles are limiting	The preambles are limiting
(claim 1)		Ex. 1033, 40–43
"a non-transitory computer-readable medium comprising [computer-readable] instructions for depositing a check" (claim 10)		
"mobile device" (claims 1, 3, 5, 10)	"computing device capable of being easily moved and that is controlled by a mobile operating system"	"computing device capable of being easily moved and that is controlled by a mobile operating system." Ex. 1033, 43–45

IPR2021-01070 Patent 8,699,779 B1

Claim Term	Agreed Construction or Proposed by Patent Owner	Texas Court's Construction
"deposit system" (claim 10)	"a system for providing a check to a depository in a form sufficient to allow money to be credited to an account"	Not addressed by the Texas court Ex. 1033, 66
"capture the image of the check" (claims 1, 10)	No further construction necessary	Plain meaning Ex. 1033, 49–56
"determin[ing] whether the image of the check aligns with the alignment guide" / "the image of the check is determined to align with the alignment guide" (claims 1, 10)	"determining that the alignment of the image of the check is within an acceptable threshold such that the image can be electronically read"	Plain meaning Ex. 1033, 67–72
"when the image of the check is determined to align with the alignment guide" (claims 1, 10)	"at or after the moment the image of the check is determined to align with the alignment guide"	"at or after the moment the image of the check is determined to align with the alignment guide" Ex. 1033, 67–73

IPR2021-01070 Patent 8,699,779 B1

Claim Term	Agreed Construction or Proposed by Patent Owner	Texas Court's Construction
"when at least [one edge / a first edge and a second edge / a first edge, second edge, and a third edge] of the image of the check aligns" (claims 7–9, 15–17)	No further construction necessary	"at or after the moment at least [one edge / a first edge and a second edge / a first edge, second edge and a third edge] of the image of the check aligns" Ex. 1033, 67–73

In the Petition, "Petitioner relies on the constructions urged by [Patent Owner] in the co-pending district court litigation or as the parties agreed." Pet. 20.

Patent Owner contends that the District Court in the Texas case has adopted these constructions and urges us to apply them in this proceeding. PO Resp. 30–31 (citing Ex. 1033, 12–13, 40–72).

As both parties apply the constructions in the "Agreed Construction or Proposed by Patent Owner" column in this proceeding, we do so as well. On the current record, any differences between those constructions and the Texas court's constructions do not appear to have an impact on this proceeding. Based on the record before us, we do not find it necessary to provide express claim constructions for any other terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy"

IPR2021-01070 Patent 8,699,779 B1

(quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

B. Obviousness of Claims 1, 2, 7–10, and 15–17 over Acharya and Luo Petitioner contends that claims 1, 2, 7–10, and 15–17 would have been obvious over Acharya and Luo. Pet. 30–73. For the reasons given below, Petitioner has proved by a preponderance of the evidence that these claims would have been obvious over this combination.

A claim is unpatentable under 35 U.S.C. § 103 "if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." We resolve the question of obviousness on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. 8 See Graham v. John Deere Co., 383 U.S. 1, 17–18 (1966).

1. Level of Skill in the Art

Relying on Dr. Mowry's testimony, Petitioner contends that a person of ordinary skill in the art "would have had a bachelor's degree in electrical engineering, computer science, computer engineering, or equivalent field, and at least two years of prior experience with image processing or scanning

⁸ The record does not include allegations or evidence of objective indicia of nonobviousness.

Case: 23-2124 Page: 105 Document: 32-1 Filed: 03/11/2024

IPR2021-01070 Patent 8,699,779 B1

technology involving transferring and processing of image data to and at a server," and that "[a] person with additional education or additional industrial experience could still be of ordinary skill in the art if that additional aspect compensates for a deficit in one of the other aspects of the requirements stated above." Pet. 19–20 (citing Ex. 1002 ¶ 44). We adopted this level of skill in the Institution Decision. Dec. 38-39. Patent Owner applies this level of skill in its Patent Owner Response. PO Resp. 30. As Petitioner's proposal is consistent with the technology described in the Specification and the cited prior art, we continue to apply this level of skill.

Scope and Content of the Prior Art

a) Overview of Acharya

Acharya "relates generally to a system and method for initiating a deposit transaction, where the depositor is a banking customer located at a remote location, where the item is to be deposited without physical transport of the item to a bank and where the item to be deposited is a financial instrument, e.g. a paper check, from a third party (i.e., other than the bank customer or the paying bank), payable to the depositor, where the banking customer has or creates a digital image of the financial instrument."

Ex. 1003, 1:18–26. Figure 1, reproduced below, illustrates an example:

IPR2021-01070 Patent 8,699,779 B1

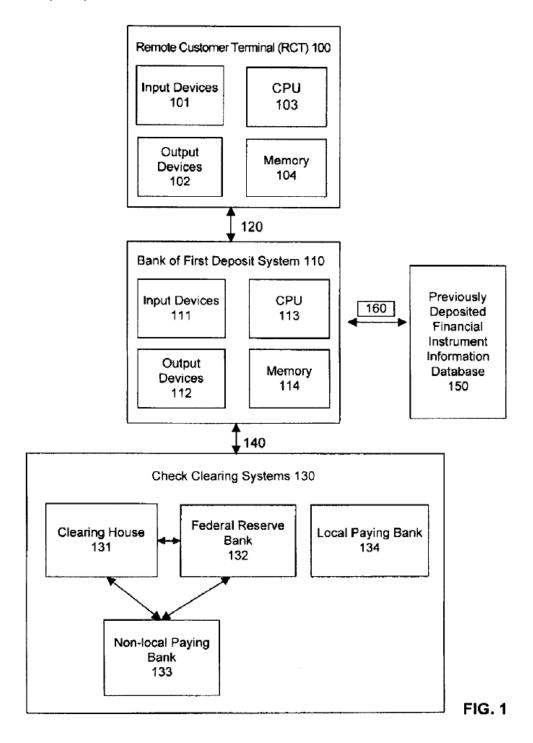


Figure 1 is a schematic diagram of a system for depositing financial instruments. *Id.* at 3:62–63, 4:9–15.

Remote Customer Terminal (RCT) 100 is connected to Bank of First Deposit (BOFD) system 110. *Id.* at 4:14–17. RCT 100 can be a telephone,

IPR2021-01070 Patent 8,699,779 B1

digital camera, fax machine, automated teller machine (ATM), cell phone, personal digital assistant (PDA), or other device, and includes input devices 101, output devices 102, central processing unit (CPU) 103, and memory 104. *Id.* at 4:18–22, 4:32–34. RCT 100 communicates with BOFD system 110 via communication link 120, which can be, e.g., a dedicated line or the Internet. *Id.* at 5:53–58. BOFD system 110 is connected to check clearing systems 130 via communication link 140. *Id.* at 6:32–36.

A method of depositing financial instruments in the context of the system of Figure 1 is depicted in Figure 2, reproduced below:

IPR2021-01070 Patent 8,699,779 B1

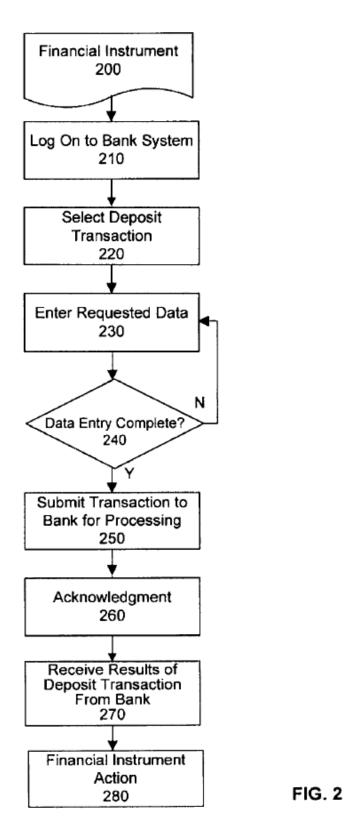


Figure 2 is a flow diagram illustrating the flow of information from the perspective of a banking customer. *Id.* at 3:64–65, 6:52–54.

IPR2021-01070 Patent 8,699,779 B1

The banking customer may first prepare a digital image of a financial instrument (e.g., a check) using a digital camera and store the image in memory 104. *Id.* at 7:14–22. The banking customer may additionally access software that can recognize data in the digital image and store that in memory 104 along with the digital image. *Id.* at 7:23–30; see also id. at 4:65–5:6 ("For example, optical character recognition software may be used in conjunction with the [Digital Image Scanner (DIS)] or the digital camera to convert machine printed characters on the financial instrument or the digital image of the financial instrument to electronic text. Likewise, intelligent character recognition software may be used to convert handwritten characters on the financial instrument or on the digital image of the financial instrument to electronic text."). "In another embodiment, in addition or alternatively, the banking customer may enter data into the RCT memory 104 using RCT input devices 101 such as the keypad, keyboard or microphone for storage." *Id.* at 7:30–33. "Data may comprise customer identification, customer account number, name of payor, name and routing number of payor's bank, the amount of the financial instrument, an image of the financial instrument, along with other information." *Id.* at 7:37–41.

To deposit the check, the banking customer logs on to BOFD system 110 from RCT 100, selects a "deposit" option from a menu of transaction options, and is prompted to deposit a financial instrument. *Id.* at 6:55–7:7 (steps 200–230). In response to a prompt for additional information (step 240), "the banking customer may submit the data taken from the financial instrument, along with the digital image of the financial instrument, to the BOFD system 110 for processing 250, and may receive acknowledgement from the BOFD system 110 that the transaction is being processed 260." *Id.* at 7:42–47. The banking customer may then receive a

IPR2021-01070 Patent 8,699,779 B1

response indicating immediate provisional credit for the deposit (step 270). *Id.* at 8:4–8.

b) Overview of Luo

Luo describes a technique for capturing an image of an object with straight edges (e.g., a business card) that reduces projective distortion in the image, whereby the image is captured only when a straight edge of the object shown in a camera's preview window is substantially parallel to a reference line. Ex. 1004, Abstr. Luo notes that "today's digital cameras are often integrated into mobile phones, personal digital assistants (PDAs), and laptops," with the result that "people in business can use digital cameras incorporated into mobile phones to quickly and easily capture digital images of their business cards." *Id.* at 1. However, it is "unideal" when one "holds the business card in front of the camera lens with one hand, while holding the camera with the other hand when taking pictures," because of "variable factors such as the distance from the lens to the business card, and the angle of the camera's image plane relative to the front of the business card," such that "the image resulted may contain defects such as projective distortion." *Id.* Figure 2, reproduced below, illustrates an example of Luo's solution:

IPR2021-01070 Patent 8,699,779 B1

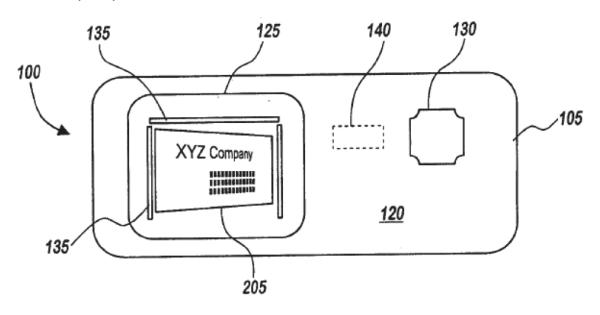


Fig. 2

Figure 2 is a schematic diagram of back 120 of camera system 100. *Id.* at 3.

Back 120 includes preview window 125, which displays an image received by image sensor 115 (shown in Figure 1). *Id.* When mode selection switch 130 is set to a document capture mode, reference line(s) 135 is displayed in preview window 125. *Id.* Reference line 135 guides the user to position image sensor 115 in an appropriate orientation with respect to the business card being captured. *Id.* at 4. "[W]hen the system 100 is in the document capture mode, the system 100 provides the user with an image of a captured object, such as a business card, only when the straight edge 205 of the business card is substantially parallel to the corresponding reference line 135 displayed in the preview window 125." *Id.* at 5. For example, "when the system 100 operates in the document capture mode..., the system 100 displays that the object plane 310 and the image plane 320 are not substantially parallel, so the final business card image cannot be captured." *Id.* To implement this, "image edge detection techniques can be used to reliably calculate the angle between a specific reference line 135 and

IPR2021-01070 Patent 8,699,779 B1

the corresponding straight edge 205 in the document preview image." *Id*. Luo's Figure 5 (a larger version of the image shown in preview window 125 of Figure 2) displays three reference lines 135, but Luo notes that two, three, four, or more lines could be used, and the lines need not be orthogonal. *Id*.

Luo describes "[v]arious techniques" to indicate to the user that the business card is aligned properly, including "an alarm composed of sounds, such as a clicking sound output from the camera system 100," or "[a] light illuminated in the preview window 125 or the light illuminated elsewhere in the camera system 100." *Id.* at 6. "As an alternative, when the straight edge 205 displayed on the preview window 125 is substantially parallel to the corresponding reference line 135, the system 100 can automatically capture the selected image and provide the user with or without instructions." *Id.*

According to Luo, through use of its techniques, "the projective distortion in the image is reduced, and the image is clearer and more accurate. With reduced projective distortion, it is more likely to perform an accelerated image capture process, such as an optical character recognition process performed on a text image, with high accuracy." *Id.* at 7.

3. Claims 1, 2, 7–10, and 15–17, Differences Between the Claimed Subject Matter and Acharya and Luo; Reasons to Modify or Combine

Petitioner cites Acharya for its disclosure of capturing images of checks suitable for extracting typical check data, but acknowledges that "Acharya does not expressly disclose details of how its system determines that an image is suitable for capture or how to implement the customer prompt for capturing such an image." Pet. 30. Petitioner cites Luo for such implementation details. *Id.* at 30–36.

IPR2021-01070 Patent 8,699,779 B1

Patent Owner does not challenge Petitioner's mapping of disclosure in Acharya and Luo to the limitations of claim 1; rather, Patent Owner argues that a skilled artisan would not have combined Acharya and Luo. PO Resp. 31–58.

Below, we address the limitations of claim 1, whether a skilled artisan would have combined Acharya and Luo, and finally the remaining challenged claims.

a) Claim 1

Claim 1 recites "[a] system for depositing a check." Petitioner cites Acharya for a teaching of a system for depositing a check, referring, in particular, to Acharya's Figure 1. Pet. 36–38. Figure 1 (reproduced above) shows Remote Customer Terminal (RCT) 100 communicating with Bank of First Deposit (BOFD) system 110, which, in turn, communicates with check clearing systems 130. Ex. 1003, 5:53–54, 6:32–38. In one example,

Either when prompted or prior to accessing the BOFD system, the banking customer captures the digital image of the financial instrument by the scanner or the digital camera and prepares a file storing the digital image. Upon prompting by the BOFD system, the banking customer forwards the digital image to the BOFD system along with the data that was either 'recognized' from the digital image of the financial instrument or was input into the RCT by the banking customer. . . .

The automated system can provide immediate provisional credit from the BOFD system to the banking customer, and forward the digital image of the financial instrument and other data to a clearing house in the form of an ECP transaction.

Id. at 3:11–25. We find that this teaches a system for depositing a check.

Claim 1's system includes "a mobile device having a camera, a display and a processor." Petitioner contends that Acharya's RCT 100 is a

IPR2021-01070 Patent 8,699,779 B1

mobile device having a camera, a display, and a processor. Pet. 38–39. We agree. For example, "RCT 100 may be a telephone, digital camera, fax machine, personal computer, ATM, cell phone, PDA or any other computer, apparatus, wireless handheld device such as a Blackberry(R) or PalmTreo(R) or system capable of collecting data and communicating with BOFD system 110." Ex. 1003, 4:18–22. RCT 100 may include "certain input devices 101, output devices 102, Central Processing Unit (CPU) 103, and machine-readable electronic memory 104." *Id.* at 4:32–34.

Petitioner contends that Luo provides additional implementation details that would be applicable to the mobile devices described in Acharya. Pet. 39–41. In particular, Petitioner points to Luo's description of camera system 100, including image sensor 115, preview window 125, and processor 140, as providing implementation details for Acharya's RCT 100. *Id.* (citing Ex. 1004, 1, 3, 8, Figs. 1–2). We find that Luo would have provided implementation details applicable to the mobile devices of Acharya, and, for the reasons give below, find that a skilled artisan would have combined the teachings of Acharya and Luo.

Claim 1 further recites that the mobile device's processor is configured to "project an alignment guide in the display of the mobile device, the display of the mobile device displaying a field of view of the camera." Petitioner cites to Luo's description (depicted in Luo's Figure 5, reproduced below) of a preview image of a document displayed in preview window 125 with straight edges 205 of the document shown along with reference lines 135. Pet. 41–44.

IPR2021-01070 Patent 8,699,779 B1

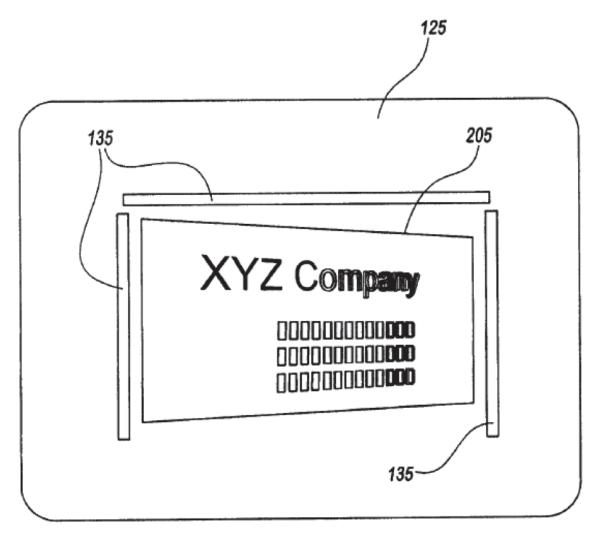


Fig. 5

As shown above, Figure 5 of Luo is a schematic diagram of preview window 125 depicting a preview image of business card 205. Ex. 1004, 2, 5.

Petitioner contends that reference lines 135 are an alignment guide, as they "guide the user of the system 100 to position the image sensor 115 in an appropriate orientation" and serve to "reduce projective distortion" by requiring that "[t]he image of the object is captured only when the straight edge (205) shown in the preview window (125) is substantially parallel to the corresponding reference line (135)." Pet. 42–43 (quoting Ex. 1004, Abstr., 7). We find that reference lines 135, which are shown projected in

IPR2021-01070 Patent 8,699,779 B1

preview window 125, teach a mobile device with a processor configured to "project an alignment guide in the display of the mobile device."

As to "the display of the mobile device displaying a field of view of the camera," Petitioner argues that a skilled artisan would have understood Luo's description of "the scene in front of the image sensor 115" to refer to the field of view of the camera. Pet. 44–45 (quoting Ex. 1004, 3; citing Ex. 1003 ¶ 86). We credit Dr. Mowry's uncontroverted testimony and find that the display of Luo's mobile device displays a field of view of its camera.

Claim 1 further recites that the mobile device's processor is configured to "monitor an image of the check that is within the field of view." Petitioner contends that Luo describes monitoring an image of a document that is within its field of view, and cites to Acharya to show that, in the proposed combination, the document would be a check rather than a business card. Pet. 45–49. Dr. Mowry testifies that, to enable Luo's device to capture an image only when the straight edges of the image are substantially parallel with the reference lines, Luo's system monitors the image of the document in preview window 125 to determine whether straight edge 205 of the document is substantially parallel to the corresponding reference lines 135. Ex. 1002 ¶ 89; Pet. 46–47 (citing Ex. 1004, 3, 6). We credit Dr. Mowry's testimony, which is consistent with and supported by Luo's disclosure. As noted above, Acharya teaches capturing an image of a financial instrument such as a check. Ex. 1003, Abstr., 3:12–13; Pet. 48. Thus, we find that the combination of Acharya and Luo teaches this limitation.

Claim 1 further recites that the mobile device's processor is configured to "determine whether the image of the check aligns with the

IPR2021-01070 Patent 8,699,779 B1

alignment guide." Petitioner cites to Luo's teaching of calculating the angle between reference lines 135 and straight edges 205 of the preview image of the document and automatically capturing the image when the straight edges and reference lines 135 are substantially parallel. Pet. 49–52 (citing Ex. 1004, 5–6, Fig. 5; Ex. 1002 ¶ 96). Based on this evidence, we find that Luo teaches this limitation.

Claim 1 further recites that the mobile device's processor is configured to "automatically capture the image of the check when the image of the check is determined to align with the alignment guide." Petitioner (Pet. 53–54) cites to Luo's description that "when the straight edge 205 displayed on the preview window 125 is substantially parallel to the corresponding reference line 135, the system 100 can automatically capture the selected image and provide the user with or without instructions." Ex. 1004, 6. Based on this evidence, we find that Luo teaches this limitation.

Claim 1 further recites that the mobile device's processor is configured to "transmit the captured image of the check from the camera to a depository via a communication pathway between the mobile device and the depository." Here, Petitioner relies on Acharya's description of RCT 100 forwarding a digital image of a financial instrument to BOFD system 110 via communication link 120, as shown in Figure 1 (reproduced above). Pet. 54–56 (citing Ex. 1003, 1:59–60, 3:1–3, 3:12–16, 5:53–58; Ex. 1002 ¶¶ 106–108). Based on this evidence, we find that Acharya teaches this limitation.

IPR2021-01070 Patent 8,699,779 B1

b) Reasons to Combine Acharya and Luo

As noted above, the parties dispute whether a skilled artisan would have had sufficient reasons to combine the teachings of Acharya and Luo.

Petitioner argues that Luo expressly provides reasons why a skilled artisan would have combined Luo's teachings with Acharya's teachings. Pet. 31–32. For example, Luo explains that it is difficult to capture a high-quality image of a document such as a business card with a hand-held digital camera because it is difficult to get the correct alignment and distance from the camera, resulting in projective distortion, or blurring. *Id.* (citing Ex. 1004, 1). Specifically, Luo states:

[M]any environments today for using digital cameras are not ideal for capturing high-quality images. For example, a user of a digital camera trying to capture a business card image simply holds the business card in front of the camera lens with one hand, while holding the camera with the other hand when taking pictures. But this makes unideal variable factors such as the distance from the lens to the business card, and the angle of the camera's image plane relative to the front of the business card. Therefore, the image resulted may contain defects such as projective distortion.

Ex. 1004, 1. Patent Owner attempts to limit this disclosure to the situation where a user holds a business card in one hand and operates the camera with the other, and argues that "the situation described in Luo would appear to be avoided entirely by placing the check on a surface in order to capture it," as shown in ImageNet. PO Resp. 50–51; *accord id.* at 27 ("Moreover, as the Board pointed out, the user could simply 'have placed the camera directly above the document to avoid document distortion, as taught by

⁹ ImageNet is not asserted by Petitioner in this proceeding. Its relevance is marginal, if at all, and only as an example of another solution in the art.

IPR2021-01070 Patent 8,699,779 B1

Nepomniachtchi." (quoting Ex. 2108, 53–54))¹⁰, 36 n.8 ("Dr. Mowry did not evaluate whether ImageNet (or any other remote deposit system in the industry) had issues with projective distortion or blur in captured check images." (citing Ex. 2116, 30:1–31:13)), 50 ("Petitioner's expert conceded at deposition that he has no evidence ImageNet could not address issues of blur and projective distortion." (citing Ex. 2116, 30:1–31:13)). We do not view Luo's disclosure as so limited; rather, Luo describes a general problem of projective distortion when trying to capture an image of document with a movable hand-held camera that must be aligned manually with the document. We find that a person of ordinary skill would have understood that Luo's solution would be beneficial to a user whether the user places the document on a table before capture or holds the document in his or her hand during capture. See Ex. 1002 ¶ 63.

As Petitioner observes, Luo solves the problem of projective distortion with a system that uses reference lines in the image preview window to help the user line up the document and automatically captures an image when the document is lined up correctly with the reference lines.

Pet. 31–32 (citing Ex. 1004, 5). For example, Luo explains:

The present invention ensures that the front of the object being imaged is substantially parallel to the image plane 320 of the camera system 100 to reduce the projective distortion of the image. For example, when the system 100 is in the document capture mode, the system 100 provides the user with an image of a captured object, such as a business card, only when the straight edge 205 of the business card is substantially parallel to

¹⁰ The findings of the Wells Fargo IPR panel on Nepomniachtchi's disclosure of placement of the camera is of marginal, if any, relevance to this proceeding, as Acharya, the reference Petitioner relies on, includes no such description.

IPR2021-01070 Patent 8,699,779 B1

the corresponding reference line 135 displayed in the preview window 125.

Ex. 1004, 5. Referring to its Figure 5, Luo continues:

For the purpose of illustration, the image plane 320 of the business card shown is tilted in relative to system 100 so that the top straight edge 205 of the card cannot be substantially parallel to the corresponding top reference line 135. In such positioning, when the system 100 operates in the document capture mode as described above, the system 100 displays that the object plane 310 and the image plane 320 are not substantially parallel, so the final business card image cannot be captured. As is well known in the art, image edge detection techniques can be used to reliably calculate the angle between a specific reference line 135 and the corresponding straight edge 205 in the document preview image.

Id. Thus, we find that Luo describes a technique of comparing edges of a document to guidelines to help a user line up the camera with the document, resulting in an image with less projective distortion, or blurring.

According to Petitioner, Luo explains that, due to its solution, it is easier and more accurate to use optical character recognition to capture text from the higher-quality image. Pet. 31–32 (citing Ex. 1004, 7). Lou's express description supports this argument:

[T]he camera system 100 can be used to capture only precise, clear text data images, which can be downloaded to another location before any optical character recognition is performed.

... Therefore, the present invention helps users to accurately and reliably capture an image of the front of an object, where the object plane 310 is substantially parallel to the image plane 320. Therefore, the projective distortion in the image is reduced, and the image is clearer and more accurate. With reduced projective distortion, it is more likely to perform an accelerated image capture process, such as an optical character recognition process performed on a text image, with high accuracy.

IPR2021-01070 Patent 8,699,779 B1

Ex. 1004, 7. Petitioner argues that this would have been applicable to Acharya, which describes converting machine printed characters on a digital image of a check using optical character recognition software. Pet. 31 (citing Ex. 1003, 4:67–5:2 ("For example, optical character recognition software may be used in conjunction with the DIS or the digital camera to convert machine printed characters on the financial instrument or the digital image of the financial instrument to electronic text.")).

Dr. Mowry testifies that, "[g]iven these difficulties in using handheld devices to capture suitable images, a person of ordinary skill in the art would have been motivated to implement Acharya using the reference lines and capture techniques described in Luo in order to achieve a high likelihood of obtaining images that were suitable for image processing." Ex. 1002 ¶ 63. According to Dr. Mowry, Luo's solution is "directly applicable to capturing check images to predictably increase the likelihood of obtaining images that are suitable for" optical character recognition. *Id.* Dr. Mowry's testimony is consistent with the express disclosures in Acharya and Luo and, therefore, is credible.

Acharya expressly identifies technology that it uses to capture information from documents, namely optical character recognition, and Luo expressly describes a technique designed to reduce projective distortion when capturing an image of a document, such that optical character recognition can be performed more accurately. Dr. Creusere admitted on cross-examination that "correcting geometric distortion will make it easier to perform automatic text recognition." Ex. 1037, 89:1–2. Petitioner contends that its proposed combination would have amounted to applying a known technique to a known device ready for improvement to yield predictable results. Pet. 32–34; see also KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398,

IPR2021-01070 Patent 8,699,779 B1

417 (2007) ("[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill."); Ex. 1002 ¶ 64 ("Implementing Acharya's RCT using Luo's camera system would have simply involved applying a technique that was known to a device that was known and ready for improvement, to yield predictable results."). We agree. This appears to be a textbook example of using a technique that improved one device to improve a similar device in the same way. As we preliminarily observed in the Institution Decision (Dec. 54), a combination of Acharya and Luo would have been no more than "[t]he combination of familiar elements according to known methods" and, thus, likely obvious because it "does no more than yield predictable results." *KSR*, 550 U.S. at 416.

Petitioner argues, and Dr. Mowry testifies, that a skilled artisan would have had a reasonable expectation of success, as Luo itself explains that the software that would implement the invention would be easy to produce for a generic processor, which Acharya also employs. Pet. 34 (citing Ex. 1003, 4:63–65; Ex. 1004, 8; Ex. 1002 ¶ 66). Other similarities Petitioner and Dr. Mowry note that would lead to a reasonable expectation of success include that both Acharya and Luo describe their respective inventions as implemented on the same types of handheld devices, and the documents on which both operate have straight edges and are subject to optical character recognition. *Id.* at 35 (citing Ex. 1003, 1:21–22, 4:18–20, 4:37; Ex. 1004, 1, 4, 6; Ex. 1002 ¶¶ 67–68). We credit Dr. Mowry's testimony, which is consistent with the disclosures of Acharya and Luo on this point, and find

IPR2021-01070 Patent 8,699,779 B1

that a skilled artisan would have had a reasonable expectation of success in combining the teachings of Acharya and Luo. Ex. 1002 ¶¶ 66–68.

Petitioner's evidence of obviousness is particularly strong and straightforward.

Nevertheless, Patent Owner offers arguments and evidence in response. Patent Owner groups its arguments into four categories:

- (1) Petitioner's own asserted references—Acharya,
 Nepomniachtchi, and ImageNet[11]—show that the
 established method of remote check deposit in the art was
 to have the customer manually capture or otherwise
 obtain check images and provide the images and/or check
 data to the bank for processing.
- (2) The alleged "problem" with digital camera imaging described in Luo—misalignment/distortion caused by incorrect positioning of the camera relative to the document—was already accounted for by pre-capture instructions and deposit processing algorithms employed in the art.
- (3) A [person of ordinary skill in the art] would have expected Luo's single-criterion automatic capture technique to be less effective and undesirably burdensome on the mobile processor.
- (4) Luo teaches that its alignment guide technique can be applied with both a manual capture implementation and an auto-capture implementation. Petitioner's expert has conceded that there is no evidence that the auto-capture implementation has any benefit over the manual capture implementation.

PO Resp. 1–2; *accord id.* at 32–59.

¹¹ Neither Nepomniachtchi nor ImageNet is asserted by Petitioner in this proceeding. Their relevance is marginal, if at all, and only as examples of other solutions in the art.

IPR2021-01070 Patent 8,699,779 B1

As to the first category of arguments, Patent Owner contends that each of Acharya and Nepomniachtchi teach remote check deposit methods that employ "a 'manual capture' approach where the customer captures check images using a camera and uploads those images and/or other check data to a bank system for deposit processing." *Id.* at 39 (citing Ex. 1003, 3:12–15; Ex. 2105 ¶ 78; Ex. 1014, 37–39); see also id. at 34 ("Nepomniachtchi teaches obtaining images suitable for check deposit processing specifically and based on a manually captured image by the user, i.e., without using reference lines or automatic capture." (citing Ex. 2105 ¶¶ 62–78)). Patent Owner argues that these manual-capture methods "all leave the decision of when to capture the image in the hands of the customer despite recognizing the possibility of image quality issues in captured images, including the same types of distortions described in Luo." *Id.* at 39 (citing Ex. 2105 ¶¶ 58, 70). According to Patent Owner, "Petitioner has presented no evidence that this established method of remote check deposit in the art was perceived as inadequate for addressing projective distortion or blur," and, instead, that Petitioner presented evidence that ImageNet was commercially successful in manually capturing mobile check data. *Id.* at 36 (citing Pet. 8–10); see also id. at 37 ("Petitioner's expert was asked if he had any actual evidence that the solutions for blur and projective distortion addressed in Nepomniachtchi were any less effective than Luo. He conceded he had none." (citing Ex. 2116, 19:14–20:2, 21:19–22)).

As to Acharya, Petitioner argues that it is agnostic as to whether images are captured manually or automatically. Reply 9–10. Patent Owner's citation to Acharya (Ex. 1003, 3:12–15) does not support its contention that Acharya employs a manual capture approach and, instead, merely states that "the banking customer captures the digital image of the

IPR2021-01070 Patent 8,699,779 B1

financial instrument by the scanner or the digital camera and prepares a file storing the digital image." As Petitioner points out (Reply 10), Dr. Creusere has admitted that Acharya does not state whether images are captured manually or automatically. Ex. 1037, 120:8–20. Thus, Acharya's teachings do not support Patent Owner's argument that manual capture was the established and preferred method for remote check deposit.

As to Patent Owner's argument that Nepomniachtchi and ImageNet show that manual capture was the preferred method for remote check deposit (PO Resp. 39, 42–43 (citing Ex. 2105 ¶¶ 58, 70, 78; Ex. 1014, 37–39; Ex. 2112)), simply pointing to examples of art using manual capture does not show that manual capture was established and preferred over automatic capture, or suggest that a skilled artisan would not have pursued other solutions. *Cf. In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) ("The prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed in the '198 application. . . . Accordingly, mere disclosure of alternative designs does not teach away."). Patent Owner points to nothing in Nepomniachtchi or ImageNet that criticized, discredited, or would have discouraged automatic capture of check images.

Patent Owner also argues that Acharya teaches other ways in which a customer can deposit a check that do not include image capture, such as the customer receiving a digital image of a check from the payer or the customer entering data into the system using a keypad or keyboard. PO Resp. 40–41 (citing Ex. 1003, 2:63–66, 3:20–21, 7:5–7, 7:14–19, 7:30–33, 7:47–52). From these examples, Patent Owner concludes that "Acharya's multitude of options for providing images and/or check data to the bank system indicate

IPR2021-01070 Patent 8,699,779 B1

that the quality of the check image is not of particular importance in Acharya's system." *Id.* at 41 (citing Ex. 2115 ¶ 31). Although Patent Owner cites Dr. Creusere's testimony, that testimony does not support Patent Owner's argument. Nor does any of the other evidence Patent Owner cites. Acharya's description of multiple ways of capturing check data does not lead to a conclusion that the quality of a check image is unimportant in Acharya's system.

Patent Owner also argues that "Petitioner's expert concedes that there is no statement in Acharya that it has any issues with projective distortion or blur." PO Resp. 42 (citing Ex. 2116, 33:16–24); see also id. at 36 n.8 ("Dr. Mowry . . . testified that Acharya did not identify any problems with projective distortion or blur in its existing manual capture implementation." (citing Ex. 2116, 33:16–24)); Sur-reply 4 ("Acharya does not disclose that its optical character recognition system suffers from projective distortion problems. And any missing information can be typed in by the user." (citing Ex. 1003, 7:36–41)). Patent Owner does not cite any authority for its implicit argument that a reference must expressly state a problem before it can be ready for improvement. Indeed, the Supreme Court has rejected such a "rigid approach" of requiring a teaching, suggestion, or motivation to combine to be expressed in a reference, in favor of "an expansive and flexible approach" to evaluating obviousness. KSR, 550 U.S. at 415. In any case, Luo expressly states that its technique reduces projective distortion and improves optical character recognition. Ex. 1004, 7. Dr. Mowry testifies that a skilled artisan would have recognized that Luo's solution could be used to improve check processing, as in Acharya's system, in the same manner. Ex. 1002 ¶ 63; see also KSR, 550 U.S. at 417 ("[I]f a technique has been used to improve one device, and a person of ordinary skill in the art

IPR2021-01070 Patent 8,699,779 B1

would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill."). Dr. Mowry's testimony is consistent with the teachings of the prior art and we credit this testimony.

Patent Owner's second category of arguments is that "The 'Problem' Supposedly Motivating a [Person of Ordinary Skill in the Art] To Combine Acharya/Luo Was Already Addressed by Deposit Processing In The Art." PO Resp. 43–51. According to Patent Owner, "a [person of ordinary skill in the art] considered 'projective distortion' a solved problem in view of references like Nepomniachtchi teaching post-capture distortion correction." Sur-reply 5–6.

Patent Owner argues that, "to the extent that some check images captured in Acharya's system may be inadequate for optical character recognition, Acharya's system already provides a solution to that problem as part of its deposit processing step," namely by supplementing optical character recognition with the user manually entering missing data. PO Resp. 44 (citing Ex. 1003, 8:16–25). According to Patent Owner, "[t]he petition does not argue that a [person of ordinary skill in the art] would have been motivated to eliminate this step of Acharya's process." *Id.* This argument is not persuasive for several reasons. It was not incumbent on Petitioner to assert that a skilled artisan would have removed one solution to make room for another, although the benefits of elimination of manual entry would have been self-evident and a matter of common sense. See Perfect Web Techs., Inc. v. InfoUSA, Inc., 587 F.3d 1324, 1329 (Fed. Cir. 2009) ("[W]hile an analysis of obviousness always depends on evidence that supports the required Graham factual findings, it also may include recourse to logic, judgment, and common sense available to the person of ordinary

IPR2021-01070 Patent 8,699,779 B1

skill that do not necessarily require explication in any reference or expert opinion."); *KSR*, 550 U.S. at 421 ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.").

Moreover, Patent Owner does not cite any authority for the proposition that, simply because a prior art reference describes one solution to a known problem, a skilled artisan would not have considered other solutions to that same problem. *Cf. Fulton*, 391 F.3d at 1201 (Fed. Cir. 2004). The Federal Circuit has explained that:

a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine. See [Winner Int'l Royalty Corp. v. Wang, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000)] ("The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another."). Where the prior art contains "apparently conflicting" teachings (i.e., where some references teach the combination and others teach away from it) each reference must be considered "for its power to suggest solutions to an artisan of ordinary skill. . . . consider[ing] the degree to which one reference might accurately discredit another."

Medichem, S.A. v. Rolabo, S.L., 437 F.3d 1157, 1165 (2006) (quoting *In re Young*, 927 F.2d 588, 591 (Fed. Cir. 1991) (alterations by Federal Circuit)).

In this case, Patent Owner's argument actually supports Petitioner's position. As noted above, Patent Owner argues that Acharya itself does not identify projective distortion as a problem. PO Resp. 42. However, as

IPR2021-01070 Patent 8,699,779 B1

Patent Owner points out, Acharya describes manual entry of data to correct data not captured sufficiently by optical character recognition. *Id.* at 44. Thus, although Acharya does not expressly use the terms "projective distortion" or "blur," it recognizes that its image capture technique might be insufficient for optical character recognition and, thus, was ready for improvement. As Petitioner demonstrates above, techniques such as those taught by Luo would provide such an improvement. *See KSR*, 550 U.S. at 419–20 ("One of the ways in which a patent's subject matter can be proved obvious is by noting that there existed at the time of invention a known problem for which there was an obvious solution encompassed by the patent's claims.").

Patent Owner also argues that Nepomniachtchi¹² recognized the problem caused by projective distortion and described fixing such distortions at the server receiving the image of a check (rather than at the device capturing the image of the check). PO Resp. 45–47. Patent Owner contends that "Nepomniachtchi's technique for correcting projective distortion in captured check images is equally applicable to Acharya's embodiments, whether processing occurs on the mobile device or at the server." Sur-reply 6–7. According to Patent Owner,

to the extent a [person of ordinary skill in the art] was concerned that images captured via digital camera may contain the distortion taught by Luo, he or she would have understood that type of defect to be addressed by server-side processing (which Acharya is already performing on received check images) and would not see a need to make drastic changes to the image capture process on the customer device.

¹² As noted above, Nepomniachtchi is not asserted by Petitioner in this proceeding and is of marginal relevance.

IPR2021-01070 Patent 8,699,779 B1

PO Resp. at 46 (citing Ex. 2115 ¶¶ 33–34); 13 see also id. at 11

("Nepomniachtchi teaches that these image quality issues can be addressed through post-capture processing so that the document can be processed and data extracted successfully."), 26 ("[T]he Board determined that 'Nepomniachtchi as a whole already provides a solution that addresses image distortions." (quoting Ex. 2108, 53))¹⁴; Sur-reply 3 ("[T]here is no competent evidence that a [person of ordinary skill in the art] would look to implement Luo's alignment guide-based autocapture for business cards in Acharya in an attempt to solve the same 'projective distortion' problem as the check-deposit specific reference Nepomniachtchi."). Patent Owner argues further that another reference, Blackson, ¹⁵ also teaches techniques for correcting check images at the server receiving the images (rather than at the device capturing the images). PO Resp. 47–48.

Patent Owner argues that "[t]hese references [which we presume are Nepomniachtchi and Blackson] show that the preferred approach to dealing with perspective distortion/misalignment issues in check deposit systems, at the time of the invention, was *post-capture* image correction." *Id.* at 49; *see*

¹³ Dr. Creusere cites Exhibit 1003, 7:14–33 and 8:16–9:10 for his conclusion that Acharya teaches server-side check processing that included image correction algorithms. Ex. 2115 ¶ 33. Acharya does not support this testimony, and instead, to the extent Acharya teaches where checks are processed to obtain data, it suggests that check processing happens on the device capturing the image. Ex. 1003, 7:14–33. Dr. Cruesere's testimony on this point lacks credibility and is entitled to no weight. *See* 37 C.F.R. 42.65(a).

¹⁴ The findings of the Wells Fargo IPR panel on Nepomniachtchi's disclosure of correcting for projective distortion at the server is of marginal, if any, relevance to this proceeding, as Acharya includes no such description.

¹⁵ Blackson is not asserted by Petitioner in this proceeding.

IPR2021-01070 Patent 8,699,779 B1

also Sur-reply 4 ("[T]he evidence of record is that the motivation would be to use Nepomniachtchi's projective distortion techniques because they are especially directed at remote deposit of checks using mobile devices."). Patent Owner argues that Blackson describes Luo's approach, requiring precise alignment, as inferior. PO Resp. 49 (citing Ex. 2113, 2:61–67).

Patent Owner's arguments are misplaced. These arguments largely depend on the teachings of Nepomniachtchi, which Petitioner does not rely on and which has only marginal relevance to this proceeding. Nepomniachtchi might teach techniques to correct for projective distortion at a server that receives an image of a check. But Patent Owner points to no persuasive evidence that Acharya includes that disclosure. Patent Owner's statement that "the preferred approach to dealing with perspective distortion/misalignment issues in check deposit systems, at the time of the invention, was post-capture image correction," PO Resp. 49, is mere attorney argument unsupported by persuasive evidence. We do not find that post-capture image correction was the preferred approach, that post-capture image correction was preferred to preventing distortion at the time of image capture, or that these two techniques would have been mutually exclusive. But even if post-capture image correction were the preferred approach, that would not undermine Petitioner's contentions. See PAR Pharm., Inc. v. TWI Pharms., Inc., 773 F.3d 1186, 1197–98 (Fed. Cir. 2014) ("Our precedent, however, does not require that the motivation be the best option, only that it be a suitable option from which the prior art did not teach away."); In re Mouttet, 686 F.3d 1322, 1334 (Fed. Cir. 2012) ("This court has further explained that just because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes." (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994))); *Fulton*, 391 F.3d at 1200

IPR2021-01070 Patent 8,699,779 B1

("[O]ur case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention."); see also Mouttet, 686 F.3d at 1331 ("A reference may be read for all that it teaches, including uses beyond its primary purpose.").

As to Blackson, Petitioner argues that it is inapposite, as it describes image capture on ATM hardware, rather than mobile devices. Reply 7 (citing Ex. 2108, 2:65–3:9). We agree with Petitioner. Blackson states that automated banking machines (which we understand to be synonymous with ATMs) have drawbacks in that checks often must be precisely aligned for reading magnetic ink coding (MICR) on the checks. Ex. 2113, 2:60–3:1. One aspect of Blackson's solution is an improved transport system and aligning device for better positioning checks. *Id.* at 5:14–39. Patent Owner does not persuasively explain the relevance of Blackson, which is not asserted by Petitioner, to check image capture using mobile devices.

Patent Owner further argues that Nepomniachtchi also teaches premanual capture techniques for avoiding projective distortion and blur, such as prompting the user to take another picture if the first is blurry. PO Resp. 47 (citing Ex. 2105 ¶¶ 61, 62, 73, 85; Ex. 2108 ¶ 53); see also id. at 12 ("Nepomniachtchi also teaches that the mobile device has the 'ability to identify poor quality images' and 'if the quality of the image is determined to be poor, a user may be prompted to take another image." (quoting Ex. 2105 ¶ 62)), 36 ("[T]he Board previously found that this manual capture approach (as reflected in Nepomniachtchi) 'already provides a solution that addresses image distortions,' including '(1) utilizing the user's judgment (e.g., placing the camera directly above the document, rather than at an angle, to avoid image distortion) for the pre-capturing analysis and

IPR2021-01070 Patent 8,699,779 B1

'(2) performing the image quality analysis on the mobile device to quickly determine whether the image can be accepted, needs correction, or needs retaking while the user is still physically close to the document and before starting another task."' (quoting Ex. 2108, 53)). Patent Owner argues that "Dr. Mowry could not identify any evidence suggesting that images captured by customers using Nepomniachtchi or ImageNet could not be processed successfully for deposit. Dr. Mowry also could not identify any evidence suggesting that the projective distortion solution employed by Nepomniachtchi did not work." PO Resp. 13 (citing Ex. 2116, 19:14–20:2, 21:19–22)).

Although Patent Owner does not expressly argue that that Nepomniachtchi's and ImageNet's teachings of pre-manual capture and post-capture processing solutions teaches away from a combination of Acharya and Luo, Patent Owner appears to argue that a skilled artisan would have been dissuaded from pursuing that combination because of the solutions provided by Nepomniachtchi and ImageNet. Once again, "mere disclosure of alternative designs does not teach away." *Fulton*, 391 F.3d at 1201. We see no persuasive evidence supporting such a contention or that Nepomniachtchi's and ImageNet's teachings, if applied by Petitioner, would have been incompatible with a combination of Acharya and Luo. Indeed, Patent Owner does not point to any statements in Nepomniachtchi, Blackson, Yoon, or ImageNet (references not relied upon by Petitioner) that would discourage a user from combining Acharya and Luo, or lead a skilled artisan in a direction divergent from that combination.

To be clear, it might be that a skilled artisan would have had reasons to combine Nepomniachtchi's server-side or pre-manual capture solutions with the teachings of Acharya, although that is not a combination Petitioner

IPR2021-01070 Patent 8,699,779 B1

is asking us to evaluate. ¹⁶ In any case, the fact that other solutions to projective distortion exist does not suggest that Luo's solution would have been inapplicable to Acharya. As we explain above, Petitioner presents strong evidence that it would have been. Pet. 33–36.

As to Patent Owner's third category of arguments, Patent Owner argues that a skilled artisan "would have been discouraged from incorporating Luo's technique into Acharya given the significant associated drawbacks." PO Resp. 53. This is a more explicit argument by Patent Owner that the prior art teaches away from Petitioner's proposed combination. According to the Federal Circuit:

A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. The degree of teaching away will of course depend on the particular facts; in general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant.

Gurley, 27 F.3d at 553.

Nepomniachtchi and Yoon and the solutions they provide for minimizing projective distortion (Ex. 2108, 45–69) are based on the particular facts of that proceeding, including the express teachings of those references, not present in the references advanced by Petitioner in this proceeding, and the particular arguments made by the petitioner in that proceeding. Thus, they are of little, if any, relevance to this proceeding. Patent Owner argues that Dr. Mowry admitted that Nepomniachtchi is directed to the same problem as Acharya and that Nepomniachtchi's methods of addressing projective distortion would be relevant to Acharya. PO Resp. 16–17 (citing Ex. 2116, 35:1–9, 124:12–23). That is not an admission that the particular features of Nepomniachtchi cited by Patent Owner are taught in or implicitly a part of Acharya.

IPR2021-01070 Patent 8,699,779 B1

First, Patent Owner argues that incorporating Luo's technique into Acharya's system would have imposed "additional processing overhead and complexity on the customer's device as compared to the existing manual capture system" and that "[t]his type of processing, especially when done in real-time, was considered computationally-intensive in 2009." PO Resp. 53 (citing Ex. 2115 ¶ 35). The only evidence Patent Owner offers to support this assertion is the testimony of its expert, who largely copies Patent Owner's argument and does not identify the basis for the testimony. As such, the testimony is entitled to little weight. See 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight."); see also Velander v. Garner, 348 F.3d 1359, 1371 (Fed. Cir. 2003) ("It is within the discretion of the trier of fact to give each item of evidence such weight as it feels appropriate."); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 294 (Fed. Cir. 1985) ("Lack of factual support for expert opinion going to factual determinations, however, may render the testimony of little probative value in a validity determination."). We note that Luo describes its technique as implemented on conventional computing equipment on portable devices available prior to 2009 without mention of concerns over processing overhead. Ex. 1004, 8. Patent Owner's evidence is insufficient to establish that concerns over processing overhead would have dissuaded a skilled artisan from pursuing a combination of Acharya and Luo.

Patent Owner argues that the Board, in the Wells Fargo IPR, determined that implementing pre-capture monitoring and auto-capturing features on a mobile device would impose additional computational burdens on that mobile device. PO Resp. 25–26 (citing Ex. 2108, 29, 37–38). Patent

IPR2021-01070 Patent 8,699,779 B1

Owner argues that Petitioner ignores this finding. *Id.* at 26. Patent Owner overstates the Board's findings in the Wells Fargo IPR and their relevance to this proceeding.

In the Wells Fargo IPR, a Board panel determined that the petitioner in that proceeding did not provide a persuasive reason to combine the teachings of Nepomniachtchi and Yoon. Ex. 2108, 27–28. In that case, the petitioner argued that "one of ordinary skill in the art would have been motivated to combine Nepomniachtchi and Yoon to: (1) reduce the computational burden." Ex. 2108, 28. The petitioner in that proceeding argued that Nepomniachtchi's algorithm to correct skew (which was performed on the server) was computationally intensive, and that improving the user's ability to capture the image without skew would have minimized the need to use this algorithm and, accordingly, would have reduced the burden of computations performed by the mobile device. Id. Against this backdrop, the Wells Fargo IPR panel determined that adding pre-capture monitoring and auto-capturing features on Nepomniachtchi's mobile device (per the teachings of Yoon) would not have decreased computational burden on the mobile device, because Nepomniachtchi teaches correcting skew at the server, not the mobile device. *Id.* at 29. Instead, the Board panel accepted Patent Owner's argument that adding such features to Nepomniachtchi's mobile device would increase the computational burden at the mobile device. *Id.* Thus, the Board panel determined that Patent Owner's evidence undermined the petitioner's assertion (not made by Petitioner in this proceeding) that Yoon's teaching would reduce the computation burden at the mobile device:

Significantly, Petitioner's argument rests on the premise that "the combination lowers the burden of the correction step" so

IPR2021-01070 Patent 8,699,779 B1

that it would reduce the burden of the computation performed by the mobile device. Nepomniachtchi, however, teaches using the server to perform the correction step in its preferred embodiment. Notably, Nepomniachtchi teaches that "the server may clean up the image by performing auto-rotate, de-skew, perspective distortion correction, cropping, etc." and that "a server based implementation might be employed to off-load processing demands from the mobile device." Any reduction in the correction processing would result in an efficiency gain at the server, not the mobile device. Therefore, Petitioner does not explain sufficiently how adding Yoon's monitoring and capturing features on the mobile device would reduce the computation burden on the mobile device.

Id. at 30–31 (internal citations omitted). The Board panel further determined that Nepomniachtchi's skew-correction algorithm was computationally intensive because the petitioner's expert admitted as much, and reasoned that "a relevant artisan would have used the server to perform [Nepomniachtchi's] correction processing, instead of the mobile device, in order to avoid excessive burden on the mobile device, slower response times, and user dissatisfaction." Id. at 33. Thus, the Wells Fargo IPR panel found that Patent Owner's evidence undermined the petitioner's argument on the particular facts of that proceeding, including the particular technical features of prior art references not asserted here. We do not understand the Wells Fargo IPR panel to have made general findings of teachings away that would be applicable to prior art references not asserted in that proceeding. As such, the Wells Fargo IPR panel's findings are of marginal relevance here.

Second, Patent Owner argues that "alignment of the document relative to the camera is only one of many factors that impact the quality of a captured image, particularly when capturing an image of a check for deposit processing," and that adding Luo's automatic capture to Acharya's system

IPR2021-01070 Patent 8,699,779 B1

would have ignored those other factors, resulting in images not sufficient for deposit. PO Resp. 54–55; Sur-reply 17 ("[T]here is no dispute that the automatic capture technique taught by Luo triggers capture of an image based solely on whether the edges of the document line up with the reference lines displayed on the screen. As Dr. Creusere explains, a [person of ordinary skill in the art] would have been discouraged from using this technique for check image capture because there are a multitude of factors that impact whether a captured check image can be successfully processed for deposit, many of which have nothing to do with alignment or 'projective distortion' that Luo purportedly corrects." (citing Ex. 2115 ¶¶ 27, 28, 36)). According to Patent Owner, Luo's approach has "two drawbacks":

(1) Luo's system will automatically capture images when the reference lines are aligned, even if the image is insufficient for deposit for other reasons not analyzed by Luo; and (2) Luo's system will <u>not</u> capture images when the reference lines are <u>not</u> aligned, even if the overall image is sufficient for deposit.

PO Resp. 55. Patent Owner argues that the first alleged drawback "results in an increase in the number of deposit errors" and the second "results in user frustration." *Id.* (citing Ex. 2115 ¶ 36). Patent Owner further argues that

a [person of ordinary skill in the art] would have expected Luo's single-criterion automatic capture technique to be less effective and undesirably burden[some] to the mobile processor implement[ation] in comparison to [the] existing manual capture technique employed by Acharya and [Nepomniachtchi], and ImageNet, and would have been discouraged from making the combination, particularly in view of the limited and uncertain benefits of doing so described above.

Id. at 38.

In support of this argument, Dr. Creusere testifies that, in Petitioner's combination of Acharya and Luo, the camera "would automatically capture

IPR2021-01070 Patent 8,699,779 B1

a check image when the reference lines are substantially aligned with the edges of the check, regardless of the quality of the image with respect to other factors such as brightness, contrast, focus, background, legibility of critical information such as the MICR line, and so forth." Ex. 2115 ¶ 36 (citing Ex. 2105 ¶¶ 58–62). On the other hand, Dr. Creusere testifies, "the Acharya/Luo combination would also only capture images when the reference lines are at least substantially aligned with the edges of the check, even if the overall image was suitable for deposit." Id. According to Dr. Creusere, "[b]oth of these concerns would discourage a person of ordinary skill in the art from making the combination in the first place, particularly given the alternatives available in the art." Id. Dr. Creusere does not identify the basis for his testimony that an Acharya/Luo combination would ignore other image quality factors that he states a skilled artisan would have considered "critical." Thus, we assign little weight to this testimony. It also is inconsistent with Luo, which states that its "camera system 100 can be used to capture only precise, clear text data images, which can be downloaded to another location before any optical character recognition is performed," and that

the present invention helps users to accurately and reliably capture an image of the front of an object, where the object plane 310 is substantially parallel to the image plane 320. Therefore, the projective distortion in the image is reduced, and the image is clearer and more accurate. With reduced projective distortion, it is more likely to perform an accelerated image capture process, such as an optical character recognition process performed on a text image, with high accuracy.

Ex. 1004, 7. Thus, Luo itself states that its image capture technique would have been sufficient to capture images of high image quality, which suggests that it would have been able to capture images of checks suitable for deposit.

IPR2021-01070 Patent 8,699,779 B1

Petitioner responds that Patent Owner's argument that the combination would replace manual capture with autocapture is misplaced because Acharya does not describe how it captures check images. Reply 9–10. As explained above, we agree. Petitioner also argues that, even if using autocapture, a skilled artisan would still apply judgement and knowledge in obtaining check images. *Id.* at 10–11. Petitioner points to Dr. Creusere, who testified on cross-examination that a skilled artisan would have understood that an image needs to have a sufficient light brightness and could manually adjust the position of a digital camera to achieve sufficient brightness, and that it was general logic and common sense that someone would want an acquired image to be in focus. Ex. 1037, 61:14–62:5, 67:3–7. Thus, a skilled artisan would have recognized that a user of the mobile device of Acharya and Luo would still have taken steps to ensure a high quality image, even with automatic capture.

Petitioner also introduces evidence, including testimony from Dr. Mowry, that camera phones in 2008 had features such as autofocus and automatic exposure controls. Reply 11–12; Ex. 1036 ¶¶ 28–34 (citing Exs. 1053–1055). Dr. Cruesere admitted as much. Ex. 1037, 67:13–21, 68:1–6. As noted above, a skilled artisan would have been an experienced engineer. We credit Dr. Mowry's testimony that Luo's autocapture feature would have been used with such admittedly known techniques. Ex. 1036 ¶¶ 28–34; Reply 11–12; *see also KSR*, 550 U.S. at 421 ("A person of ordinary skill is also a person of ordinary creativity, not an automaton."). Thus, we disagree with Patent Owner's argument that a skilled artisan would have been dissuaded from combining Acharya and Luo.

Patent Owner argues that the Wells Fargo IPR panel concluded that, in a combination of Nepomniachtchi and Yoon (once again, references not

IPR2021-01070 Patent 8,699,779 B1

asserted in this proceeding), the system would automatically capture an image as soon as the borders of the check aligned with the alignment guide, even if it the image was not suitable for capture. PO Resp. 55 (citing Ex. 2108, 59); see also id. at 29 ("[T]he Board agreed that there would be drawbacks to the proposed combination [of Nepomniachtchi and Yoon] given that it would 'automatically capture the image as soon as the borders of the check image aligned with the rectangular alignment guide, whether or not the image was suitable in other respects.' The same criticism would apply to the proposed combination with Luo." (quoting Ex. 2108, 59)), 29– 30 ("The Board agreed with Patent Owner that a [person of ordinary skill in the art] 'would have no reason to expect that a system evaluating only alignment and/or brightness prior to capture would automatically capture check images that were suitable for deposit processing based on all of the criteria identified in Nepomniachtchi' and that 'replacing a user's judgment that is based on numerous factors, with an auto-capture system based solely on alignment, would not minimize the need for retaking the images, but would instead introduce additional errors,' such as capturing images when the check is 'upside down' or does not have 'MICR information [] in the correct location' or has inadequate 'resolution or focus.'" (quoting Ex. 2108, 61)). The Wells Fargo IPR panel based its findings on admissions by the petitioner in that case that combining Nepomniachtchi and Yoon would replace the user's judgment about whether the image was aligned. Ex. 2108, 58. The Wells Fargo IPR panel also relied on admissions from the expert witness for the petitioner in that proceeding regarding Yoon, a reference not asserted in this proceeding. *Id.* at 60–61. Thus, the Wells Fargo IPR panel made its findings and conclusions based on the particular record of that

IPR2021-01070 Patent 8,699,779 B1

proceeding, which considered different prior art and testimony than Petitioner asserts here.

Patent Owner further argues that "Petitioner has stated affirmatively that the prior art lacks the teachings required to determine, by monitoring an image for automatic capture, when the captured image will meet the requirements for deposit." PO Resp. 55–60; see also Sur-reply 21. Here, Patent Owner points to Petitioner's Motion for Summary Judgement of Enablement in the Texas case, which Patent Owner opposed, and Petitioner lost. PO Resp. 56 (citing Ex. 2114, 21); Tr. 45:20–47:9. Although the exhibit provided by Patent Owner is heavily redacted, it appears that, in the Texas case, Petitioner argued that the Specification of the '779 patent did not describe additional monitoring criteria to ensure that a check image is in a form suitable for deposit, and the prior art did not include the teachings missing from the '779 patent. Ex. 2114, 21–25. Thus, at most, Petitioner argued that the prior art did not provide more detail than the '779 patent itself. In any case, Patent Owner opposed that motion and Petitioner did not prevail. Thus, any such statements in Petitioner's Motion for Summary Judgement of Enablement are of marginal value here.

For its fourth category of arguments, Patent Owner contends that Luo describes its automatic capture as an alternative approach to manual capture, and that Luo does not state that automatic capture is necessary to reduce projective distortion or blurring. PO Resp. 57 (citing Ex. 1004, 6). According to Patent Owner, "a [person of ordinary skill in the art] reading Luo would expect that the same benefits could be achieved by simply displaying the reference lines on the screen and providing an 'indication' to the user when the lines are substantially parallel to the edges of the document, as described in Luo." *Id.* (citing Ex. 1004, 6–7). Patent Owner

IPR2021-01070 Patent 8,699,779 B1

argues that "Petitioner never explains why a [person of ordinary skill in the art] would have been motivated to go beyond the primary embodiment of Luo and add the automatic capture alternative." *Id.*; see also Sur-reply 11 ("Petitioner offers no reason why a [person of ordinary skill in the art] would have been motivated to adopt the automatic capture option of Luo if the manual capture embodiment already provided the same benefits."). Patent Owner argues that using Luo's reference lines with manual capture, and without automatic capture, "would . . . provide the stated benefits of Luo, [and] would also avoid the downsides of the combination described above, such as increased errors and user dissatisfaction due to automatically capturing images at the wrong times." PO Resp. 57–58 (citing Ex. 2115 ¶ 35); see also id. at 38 ("The Petition provides no explanation as to why, even if a [person of ordinary skill in the art] would be motivated to aid an alignment guide monitored by the processor, it would then choose to add auto-capture, which would strip away human ability to ensure that other criteria that are necessary for a successful deposit are satisfied."). Patent Owner argues that "there must be a factual basis for why a [person of ordinary skill in the art] would strip away human judgment regarding the multiple factors that the Reply acknowledges can result in an image of sufficient quality, and replace it with automatic capture." Sur-reply 11 (citing Ex. 2115 \P 35). 17

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¹⁷ Patent Owner also argues that the Wells Fargo IPR panel was not persuaded that a skilled artisan would have been motivated to add Yoon's automatic capture feature to Nepomniachtchi. Sur-reply 10–11 (citing Ex. 2108, 54). The Wells Fargo IPR panel reached its findings and conclusions based on the particular facts of that case, including prior art references not at issue in this proceeding. Thus, they are of marginal, if any, relevance here.

IPR2021-01070 Patent 8,699,779 B1

In response, Petitioner argues that, "as Luo makes clear that, once the mobile device determines that the alignment guide monitoring criterion is satisfied, capturing an image using autocapture (instead of manual capture) is merely a choice between the two ways Luo gave to capture an image, both of which are equally suitable." Reply 8 (citing Ex. 1002 ¶ 119).

As we explained above, Acharya does not explain in detail how images of checks are captured (or what role human judgement would play), so Patent Owner does not have a basis to argue that Petitioner's combination would "strip away human judgment" from Acharya's technique. And as we preliminarily observed in the Institution Decision (Dec. 54–55), Luo describes both the reference lines and the automatic capture feature as beneficial to reducing projective distortion. Specifically, "[t]he reference line 135 is used to guide the user of the system 100 to position the image sensor 115 in an appropriate orientation with respect to, for example, a business card object," Ex. 1004, 4, and "when the straight edge 205 displayed on the preview window 125 is substantially parallel to the corresponding reference line 135, the system 100 can automatically capture the selected image and provide the user with or without instructions," id. at 6. Luo's reference lines help the user position the camera in an orientation that will result in the camera automatically capturing an image of the document. These features work together to capture an image with reduced projective distortion and the current record suggests that the combined features would have improved Acharya in the same way. Ex. 1002 ¶ 83; see KSR, 550 U.S. at 417. Moreover, as explained above, we find that the prior art does not teach away from automatic capture of images.

However, even if the evidence suggested that manual capture had advantages over automatic capture (it does not), "just because better

IPR2021-01070 Patent 8,699,779 B1

alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes." *Mouttet*, 686 F.3d at 1334; *accord Fulton*, 391 F.3d at 1200. Rather, Luo "may be read for all that it teaches, including uses beyond its primary purpose." *Mouttet*, 686 F.3d at 1331. Luo expressly teaches automatic capture used in conjunction with reference lines, and describes the combined solution as one technique to reduce projective distortion in a captured image, resulting in more accurate optical character recognition. Ex. 1004, 6–7. For the reasons given above, we find that this teaching would have been similarly applicable to Acharya's images of checks captured and processed by optical character recognition, and would have improved the optical character recognition in a similar way, resulting in images of checks more likely to be in a form sufficient for deposit. *See KSR*, 550 U.S. at 417.

Patent Owner argues that the combination of Acharya and Luo is a situation in which disadvantages outweigh uncertain benefits. PO Resp. 56 (citing *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1329 (Fed. Cir. 2019)). According to Patent Owner,

the added complexity and disadvantages of replacing the user's decision to manually capture with an automatic capture triggered by alignment with a guide is insufficient to motivate a [person of ordinary skill in the art] to make the combination where a [person of ordinary skill in the art] knew of other, simpler solutions to the same problem that did not have the same drawbacks.

Sur-reply 15 (citing *Henny Penny*, 938 F.3d at 1329). We disagree. As explained above, the benefits of Luo's alignment guide and automatic capture to document capture, such as in Acharya, are not uncertain and, instead, are straightforward and expressly stated in Luo. Patent Owner's evidence of disadvantages is unpersuasive and rests primarily on its analysis

IPR2021-01070 Patent 8,699,779 B1

of prior art references not asserted by Petitioner and of marginal relevance to this proceeding.

In sum, on the complete record, Petitioner has shown that a skilled artisan would have had reasons with rational underpinning to combine the teachings of Acharya and Luo, with a reasonable expectation of success.

c) Claims 2, 7–10, and 15–17

Claim 10 is independent and recites a "non-transitory computer-readable medium comprising instructions for depositing a check," with instructions that track the functional limitations of claim 1. Petitioner cites to Acharya as teaching a computer-readable medium (memory 104) with computer-readable instructions for depositing a check. Pet. 66–69. We agree, and find that Acharya teaches a computer-readable medium with instructions for depositing a check. Patent Owner does not contest this allegation.

As to the remaining limitations of claim 10, Petitioner largely refers to its analysis of claim 1. *Id.* at 69–71. Patent Owner does not argue claim 10 separately. For the reasons given for claim 1, we find that Acharya and Luo teach each limitation of claim 10 and that a skilled artisan would have had reasons, with rational underpinning, to combine the teachings of Acharya and Luo, with a reasonable expectation of success.

Claim 2 depends from claim 1 and adds "wherein the processor is further configured to obtain financial information pertaining to the check from the captured image of the check." Petitioner cites to Acharya's description of using optical character recognition to recognize information such as the MICR line, routing number, and account number from a check.

IPR2021-01070 Patent 8,699,779 B1

Pet. 57–58 (citing Ex. 1003, 2:50–56, 4:63–5:6). Based on this evidence, we find that Acharya teaches the additional limitation of claim 2.

Claims 7, 8, and 9 depend from claim 1 and add that the processor is configured to determine that the image of the check aligns with the alignment guide when at least one, two, and three edges, respectively, align with one, two, and three line portions of the alignment guide. Claims 15, 17, and 16 depend from claim 10 and add substantially the same limitations. As Petitioner points out, Figure 5 of Luo shows three reference lines with which the image of a business card can be aligned. Pet. 58–65. Luo states that "those skilled in the art should recognize that different numbers of reference lines 135 may be used according to different embodiments of the present invention, such as two, three, four or more baselines 135." Ex. 1004, 5. Based on this evidence, we find that Luo teaches the additional limitations of claims 7–9 and 15–17.

Patent Owner does not argue claims 2, 7–9, and 15–17 separately.

4. Conclusion of Obviousness

As explained above, the combination of Acharya and Luo teaches each limitation of claims 1, 2, 7–10, and 15–17. Petitioner has introduced persuasive evidence that a skilled artisan would have had reasons to combine the teachings of Acharya and Luo with a reasonable expectation of success. Patent Owner does not argue or introduce evidence of objective indicia of nonobviousness. In sum, upon consideration of all the evidence, we conclude that Petitioner has proved by a preponderance of the evidence that claims 1, 2, 7–10, and 15–17 would have been obvious over Acharya and Luo.

IPR2021-01070 Patent 8,699,779 B1

III. PATENT OWNER'S MOTION TO EXCLUDE

A. Exhibits 1053, 1054, and 1055

Patent Owner argues that Exhibits 1053–1055, which it describes as web page printouts of articles from a website called "Mobile Gazette" regarding the "Toshiba Portege G910 / G920," "i-Mate Ultimate 9502," and "Sony Ericsson XPERIA X1," respectively, are hearsay under Federal Rule of Evidence 802 and no hearsay exception applies. Mot. Exclude 1–3.

Petitioner argues that there is no dispute that the exhibits are authentic, the exhibits are probative, and the exhibits were relied upon and cited by Dr. Mowry in his testimony. Opp. Exclude 2–5.

In its Reply, Patent Owner argues that, although "an expert is entitled to rely on inadmissible evidence in reaching his or her opinions, an expert's citation to hearsay does not render the underlying information admissible, nor does relevance substitute for admissibility under the Federal Rules." Reply Exclude 1 (citing *Unified Patents Inc. v. American Patents LLC*, IPR2019-00482, Paper 132, at 53 (PTAB Aug. 3, 2022)).

We are persuaded that Exhibits 1053–1055 are admissible.

First, the exhibits are not hearsay. A statement is hearsay if it is one "the declarant does not make while testifying at the current trial or hearing" and "a party offers in evidence *to prove the truth of the matter asserted* in the statement." Fed. R. Evid. 801(c) (emphasis added). ¹⁸ In this case, Exhibits 1053–1055 are not offered to prove the truth of the matter asserted in these prior art articles; instead the exhibits are offered for the fact that their contents were in the prior art and available to those of ordinary skill in

With some exceptions that do not apply here, the Federal Rules of Evidence apply to this proceeding. See 37 C.F.R. § 42.62(a), (b).

IPR2021-01070 Patent 8,699,779 B1

the art. *See*, *e.g.*, *Joy Techs.*, *Inc. v. Manbeck*, 751 F. Supp. 225, 233 n.2 (D.D.C. 1990), *aff'd*, 959 F.2d 226 (Fed. Cir. 1992) ("A prior art document submitted as a 'printed publication' . . . is offered simply as evidence of what it describes, not for proving the truth of the matters addressed in the document. Therefore, it is not hearsay under Fed.R.Evid. 801(c)."). It does not matter whether the statements in the exhibits are true; what is relevant for our analysis is what was stated in the exhibits during the operative time period. *See Reis Biologicals*, *Inc. v. Bank of Santa Fe*, 780 F.2d 888, 890 (10th Cir.1986) (statements offered not for their truth or falsity, but for the fact that they were made, are for a non-hearsay purpose).

Second, even if the exhibits were hearsay, they are still admissible. As an expert, Dr. Mowry may base his opinion "on facts or data in the case that the expert has been made aware of" and such sources "need not be admissible for the opinion to be admitted." Fed. R. Evid. 703. Patent Owner has not filed a motion to exclude Dr. Mowry's testimony based on those exhibits. *See* Mot. Exclude. Thus, Dr. Mowry's testimony relying on Exhibits 1053–1055 has been properly admitted.

An expert relying on evidence is not, by itself, sufficient for the admission of the evidence. Instead, if the evidence is otherwise inadmissible, such as hearsay, the evidence may only be admitted "if their probative value in helping the [fact finder] evaluate the opinion substantially outweighs their prejudicial effect." Fed. R. Evid. 703. On one hand, to the extent we consider the portions of Dr. Mowry's testimony quoting Exhibits 1053–1055, having the underlying exhibits is helpful to judge Dr. Mowry's credibility. On the other hand, Patent Owner has not identified any prejudice associated with the admission of the exhibits. *See* Mot. Exclude. Indeed, whether we admit or exclude the exhibits, the relevant language is

IPR2021-01070 Patent 8,699,779 B1

quoted in Dr. Mowry's testimony and in the record, minimizing any potential prejudice. Thus, the probative value of the exhibits that are quoted in admissible testimony substantially outweighs the unidentified prejudice.

Accordingly, Patent Owner's motion to exclude Exhibits 1053–1055 is denied.

B. Exhibit 1056

Patent Owner argues that Exhibit 1056 contains "excerpts of an expert report of Dr. Omid Kia, served by Petitioner in [the Texas case]." Mot. Exclude 3. Patent Owner argues that Exhibit 1056 is irrelevant under Federal Rules of Evidence 401 and 402 because it is not cited in a brief. *Id.* at 3–4. Neither party cites or relies upon Exhibit 1056 in its briefs, and we do not rely on that exhibit in this Decision. Accordingly, we dismiss Patent Owner's motion to exclude Exhibit 1056 as moot.

IV. CONCLUSION¹⁹

Petitioner has shown by a preponderance of the evidence that claims 1, 2, 7–10, and 15–17 would have been obvious. Patent Owner's Motion to

¹⁹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

IPR2021-01070 Patent 8,699,779 B1

Exclude is denied as to Exhibits 1053–1055 and dismissed as moot as to Exhibit 1056.

In summary:

Claims	35 U.S.C.	Reference(s)/	Claims	Claims
	§	Basis	Shown	Not shown
			1	Unpatentable
1, 2, 7–	103(a)	Acharya, Luo	1, 2, 7–10, 15–17	
1, 2, 7– 10, 15–17			15–17	
Overall			1, 2, 7–10, 15–17	
Outcome			15–17	

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED, based on a preponderance of the evidence, that claims 1, 2, 7–10, 15–17 are unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 59) is *denied* as to Exhibits 1053–1055 and *dismissed as moot* as to Exhibit 1056;

FURTHER ORDERED, because this is a final written decision, the parties to this proceeding seeking judicial review of our Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2021-01070 Patent 8,699,779 B1

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Date: March 29, 2023

Paper 76

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1)

Before DERRICK BRENT,¹ Deputy Under Secretary of Commerce for Intellectual Property and Deputy Director of the United States Patent and Trademark Office, SCOTT R. BOALICK, Chief Administrative Patent Judge, and JACQUELINE WRIGHT BONILLA, Deputy Chief Administrative Patent Judge.

PER CURIAM.

¹ Kathi Vidal, Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office, took no part in this decision. The Director, pursuant to Standard Operating Procedure 2 (SOP 2), has delegated her authority to Derrick Brent, Deputy Under Secretary of Commerce for Intellectual Property and Deputy Director of the United States Patent and Trademark Office. *See* Director's Memorandum, Procedures for Recusal to Avoid Conflicts of Interest and Delegations of Authority (Apr. 20, 2022) (Recusal Procedure Memo), *available at* https://go.usa.gov/xJjch; SOP 2, 4 (available at https://go.usa.gov/xP7yz).

IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1)

ORDER

The Office received rehearing requests and requests for Precedential Opinion Panel (POP) review of an issue raised in these cases. *See* Paper 70; Ex. 3003.² The requests were referred to the POP panel referenced above.

Upon consideration of the requests, it is:

ORDERED that the requests for POP review are denied; and FURTHER ORDERED that the original panels maintain authority over all matters, including considering the submitted rehearing requests.

² Citations are to the record in IPR2021-01070, which is representative.

IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1)

For PETITIONER:

Monica Grewal
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Paper 72 Date: March 29, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1)

Before DERRICK BRENT,¹ Deputy Under Secretary of Commerce for Intellectual Property and Deputy Director of the United States Patent and Trademark Office, SCOTT R. BOALICK, Chief Administrative Patent Judge, and JACQUELINE WRIGHT BONILLA, Deputy Chief Administrative Patent Judge.

PER CURIAM.

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¹ Kathi Vidal, Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office, took no part in this decision. The Director, pursuant to Standard Operating Procedure 2 (SOP 2), has delegated her authority to Derrick Brent, Deputy Under Secretary of Commerce for Intellectual Property and Deputy Director of the United States Patent and Trademark Office. *See* Director's Memorandum, Procedures for Recusal to Avoid Conflicts of Interest and Delegations of Authority (Apr. 20, 2022) (Recusal Procedure Memo), *available at* https://go.usa.gov/xJjch; SOP 2, 4 (available at https://go.usa.gov/xP7yz).

IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1)

ORDER

The Office received rehearing requests and requests for Precedential Opinion Panel (POP) review of an issue raised in these cases. *See* Paper 70; Ex. 3003.² The requests were referred to the POP panel referenced above.

Upon consideration of the requests, it is:

ORDERED that the requests for POP review are denied; and FURTHER ORDERED that the original panels maintain authority over all matters, including considering the submitted rehearing requests.

² Citations are to the record in IPR2021-01070, which is representative.

IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1)

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Paper 77 Date: April 28, 2023

1

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

IPR2021-01073 Patent 8,977,571 B1

Before MICHAEL R. ZECHER, DAVID C. MCKONE, SCOTT B. HOWARD, *Administrative Patent Judges*.

HOWARD, Administrative Patent Judge.

DECISION

Denying Patent Owner's Request for Rehearing of Final Written Decision $37 C.F.R. \ \S 42.71(d)$

IPR2021-01073 Patent 8, 977,571B1

I. INTRODUCTION

PNC Bank N.A. ("Petitioner") filed a Petition (Paper 3, "Pet.") requesting *inter partes* review of claims 1–6, 9, 10, 12, and 13 of U.S. Patent No. 8,977,571 B1 (Ex. 1001, "the '571 patent"). Pet. 3. United Services Automobile Association ("Patent Owner") filed a Preliminary Response. Paper 8.¹ Pursuant to 35 U.S.C. § 314, we instituted this proceeding. Paper 20.²

Patent Owner filed a Patent Owner's Response (Paper 42, "PO Resp."), Petitioner filed a Reply to the Patent Owner's Response (Paper 45, "Pet. Reply"), and Patent Owner filed a Sur-reply to the Reply (Paper 60, "PO Sur-reply").

A consolidated oral argument was held in this proceeding and IPR2021-01070 on October 25, 2022. Paper 69 ("Tr.").

Upon consideration of the Petition, Patent Owner Response, Reply, and Sur-reply, we issued a Final Written Decision determining that claims 1–6, 9, 10, 12, and 13 of the '571 Patent are unpatentable. Paper 72 ("FWD" or "Decision"). Patent Owner filed a Request for Rehearing of the FWD. Paper 74 ("Req."). Patent Owner also submitted a request for Precedential Opinion Panel ("POP") review (Ex. 3004; Paper 75), which was denied (Paper 76). We now consider Patent Owner's Request for Rehearing.

For the reasons given below, we decline to modify our Decision.

¹ A public version of the Preliminary Response is filed as Paper 9.

² A public version of the Institution Decision is filed as Paper 25.

IPR2021-01073 Patent 8, 977,571B1

II. ANALYSIS

A. Legal Background

The burden of showing that the FWD should be modified is on Patent Owner, the party challenging the Decision. *See* 37 C.F.R. § 42.71(d) (2021). In addition, "[t]he request must specifically identify all matters the party believes [we] misapprehended or overlooked, and the place where each matter was previously addressed in a motion, an opposition, reply, or a surreply." *Id*.

B. Patent Owner's Argument that We Misapplied the Law of Obviousness

Patent Owner contends that we misapplied *Graham v. John Deere Co.* of *Kansas City*, 383 U.S. 1 (1966), by not properly assessing the scope and the content of the prior art and the differences between the prior art and the claims at issue. Req. 1.

In the FWD, we determined that challenged claims 1–3, 6, 9, 10, and 13 were unpatentable as obvious over a combination of Acharya (Ex. 1003) and Luo (Ex. 1004); claims 4 and 5 were unpatentable as obvious over a combination of Acharya, Luo, and Nepomniachtchi (Ex. 1016); and claim 12 was unpatentable as obvious over a combination of Acharya, Luo, and Yoon (Ex. 1005), the prior art references asserted by Petitioner. FWD, 9, 83. We also noted that Patent Owner cited extensively to Yoon (Ex. 2008), ImageNet (Ex. 1014, pp. 30–44), and Blackson (Ex. 2108) in its Patent Owner Response and Sur-reply. *Id.* at 9.

Patent Owner argues that we "incorrectly limited [our] analysis to the particular references that Petitioner happened to select as part of its obviousness grounds," and "consistently disregarded" Patent Owner's

IPR2021-01073 Patent 8, 977,571B1

evidence "as being of marginal" or no relevance on the basis that they were not 'asserted by Petitioner in this proceeding' (or in cases where the references were in fact asserted by Petitioner, that they were not asserted for a particular ground as part of an explicit combination)." Req. 1–2. Patent Owner argues that we did not consider the prior art as a whole, and that we should not have given Petitioner's prior art greater weight than given to Patent Owner's prior art. Id. at 4–5. In particular, "Patent Owner consistently argued throughout the papers that the Board should consider the teachings of other references, such as Nepomniachtchi, as leading the person of ordinary skill away from the claimed invention when the prior art as a whole is considered." *Id.* at 5 n.2 (citing PO Resp. 22–26, 60, 64–69). Patent Owner cites In re Dow Chemical Co., 837 F.2d 469 (Fed. Cir. 1988), to argue that we must consider the full field of the invention and that a skilled artisan is charged with the knowledge of the entire body of technical literature, including knowledge that might lead away from the claimed invention. *Id.* at 5–6. According to Patent Owner, "[h]ad the Board accorded the appropriate weight to the prior art as a whole, rather than assigning 'marginal' relevance to references not part of the specific asserted combinations laid out in the [P]etition, the evidence would have led the Board to a different result." Id. at 6.

In particular, Patent Owner argues that

by disregarding the teachings of Nepomniachtchi (or considering [it] as merely an "alternative solution" in the art), the Board failed to apprehend that the issue identified by Luo—projective distortion—was not a significant problem for check deposit systems known to a [person of ordinary skill in the art] at the time of the invention due to the availability of post-processing techniques that were especially suited to correcting

IPR2021-01073 Patent 8, 977,571B1

projective distortion, even more so than other image quality defects.

Id. at 7 (citing PO Resp. 47–49). Patent Owner continues:

by failing to apprehend that the perceived benefit to a [person of ordinary skill in the art] of incorporating Luo's technique into Acharya was minimal at best, the Board also failed to apprehend the significance of the drawbacks of the combination identified by Patent Owner and its expert, such as increased CPU [(central processing unit)] burden and higher risk of errors due to automatic capture that may occur at the wrong time.

Id. at 7–8 (citing PO Resp. 67–69; Ex. 2115 ¶¶ 30–36).

In *Dow Chemical*, the U.S. Court of Appeals for the Federal Circuit stated:

In determining whether such a suggestion can fairly be gleaned from the prior art, the full field of the invention must be considered; for the person of ordinary skill is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention.

837 F.2d at 473. In *Dow Chemical*, the applicant argued that the Office's asserted references themselves did not show that the references should or could be combined, and that additional evidence led away from the asserted combination because it showed that the combination would not have worked and would have had many problems. *Id.* at 471–72. According to the Federal Circuit, "[i]t is indeed pertinent that these references teach against the present invention. Evidence that supports, rather than negates, patentability must be fairly considered." *Id.* at 473.

Contrary to Patent Owner's assertions, we fully considered, at length, Patent Owner's evidence, including Yoon, Nepomniachtchi, ImageNet, and Blackson. *See*, *e.g.*, FWD 33–47. For example, we expressly considered whether projective distortion, identified by Luo as a problem it solved, was a

IPR2021-01073 Patent 8, 977,571B1

significant problem in light of other solutions, such as Nepomniachtchi. FWD 37–43. In particular, we considered Patent Owner's arguments that Nepomniachtchi teaches techniques for correcting projective distortion at a server that receives an image of a check, rather than at the device that captures the image, and declined to find "that post-capture image correction was the preferred approach, that post-capture image correction was preferred to preventing distortion at the time of image capture, or that these two techniques would have been mutually exclusive." *Id.* at 41–42. And even if it was, we found that a skilled artisan would have had reasons (stated expressly in Luo) to pursue other approaches. *Id.* at 42. Specifically, we found that Acharya teaches using optical character recognition in capturing check images, that Luo expressly states that its technique reduces projective distortion and improves optical character recognition, and that a skilled artisan would have recognized that Luo's solution could be used to improve check processing, as in Acharya's system, in the same manner. *Id.* at 36–37 (citing Ex. 1003, 7:36–41; Ex. 1004, 7; Ex. 1002 (Declaration of Petitioner's expert) ¶ 76). We credited the testimony of Petitioner's expert as consistent with the prior art. *Id.* at 37. In any case, as the Federal Circuit has held, its case law "does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention." In re Fulton, 391 F.3d 1195, 1200 (Fed. Cir. 2004).

As to Blackson, we considered it fully but found that it was less relevant because it described image capture on automated teller machine hardware rather than mobile devices. FWD 42. As to ImageNet, we found that it was simply an example of art using manual capture, rather than automatic capture; that it did not show that manual capture was the preferred

IPR2021-01073 Patent 8, 977,571B1

method in the art; and that it did not criticize, discredit, or discourage automatic capture. *Id.* at 35.

We also expressly considered whether Patent Owner's art teaches away from Petitioner's combination of Acharya and Luo and found that it does not. FWD 35 (finding that "Patent Owner points to nothing in Nepomniachtchi or ImageNet that criticized, discredited, or would have discouraged automatic capture of check images"), 43–44 (finding that "Patent Owner does not point to any statements in Nepomniachtchi, Blackson, Yoon, or Mitek (another reference not relied upon by Petitioner for this ground) that would discourage a user from combining Acharya and Luo, or lead a skilled artisan in a direction divergent from that combination"). In short, we found that Patent Owner's references, e.g., Nepomniachtchi, Blackson, Yoon, and ImageNet, illustrated other examples of solutions in the art, but did not include teachings that would have discouraged a combination of Acharya and Luo. *Id.* at 35, 43–44; *cf. Fulton*, 391 F.3d at 1201 ("The prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed in the '198 application. . . . Accordingly, mere disclosure of alternative designs does not teach away.").

We also expressly considered, again, at length, Patent Owner's arguments, relying primarily on Nepomniachtchi and the testimony of its expert, that a skilled artisan would have been discouraged from combining Acharya and Luo because of increased CPU burden and higher risk of errors due to automatic capture that may occur at the wrong time. FWD 44–52. We disagreed with those arguments. For example, we found that "Patent Owner's evidence is insufficient to establish that concerns over processing

IPR2021-01073 Patent 8, 977,571B1

overhead would have dissuaded a skilled artisan from pursuing a combination of Acharya and Luo." *Id.* at 45.

In sum, we did not overlook the prior art references advanced by Patent Owner or the arguments it made in advancing those references. We also did not misapprehend the teachings of those references or Patent Owner's arguments as to what they teach. Rather, we disagreed with Patent Owner's arguments and found that Patent Owner's prior art references do not teach what Patent Owner asserts that they teach. For that reason, we found that those prior art references had marginal, if any, relevance. Although Patent Owner might disagree with our findings, such disagreement is not a basis for rehearing.

C. Patent Owner's Argument that We Failed to Justify a Departure from a Prior Panel's Factual Findings

In Wells Fargo Bank, N.A. v. United Services Automobile Association, IPR2019-01082 (the "Wells Fargo IPR"), a panel of the Board determined that claims of the '571 patent were not unpatentable as obvious over Nepomniachtchi³, Yoon, and Acharya. Ex. 2101 (Final Written Decision in the Wells Fargo IPR). Patent Owner argues that the Wells Fargo panel determined that it would not have been obvious to modify a pre-existing remote check deposit system to automatically capture images when the

³ In the Wells Fargo IPR, the Board considered the teachings of Nepomniachtchi, US 7,778,457 B2, issued August 17, 2012 (Ex. 2102). Patent Owner contends that "[t]he Nepomniachtchi reference asserted here is substantively identical to the Nepomniachtchi patent [that was] used as the base reference in the prior [Wells Fargo IPR]—both claim priority to the same provisional application and contain similar disclosures." PO Resp. 7 n.3. (citing Ex. 1016, 1; Ex. 2102, 1; Pet. 7–8).

IPR2021-01073 Patent 8, 977,571B1

edges of a document align with an alignment guide. Req. 8. Patent Owner contends that we "reached the opposite conclusion, but failed to adequately explain why [we] disagreed with the prior panel's analysis of common facts." *Id*.

Referring to the arguments it made pursuant to 35 U.S.C. § 325(d) in the Preliminary Response (Paper 8), Patent Owner argues that "the instant petition involves the same or substantially the same art, the same or substantially the same arguments, and the same relevant factual issues that were evaluated by the Board in [the Wells Fargo IPR]," and that Petitioner made no showing of material error by the Wells Fargo panel. Req. 9. Patent Owner argues that we "should have deferred to the Wells Fargo IPR panel's evaluation of pertinent prior art such as Nepomniachtchi." *Id.* at 9–10.

We explained in the Institution Decision why Patent Owner's Section 325(d) argument was unpersuasive. Paper 20 at 30–35. To the extent Patent Owner wants us to revisit our determination under Section 325(d), it should have requested rehearing of our Institution Decision. It is too late to do so now.

Patent Owner also argues that we rejected its argument that implementing automatic capture techniques into Acharya would require "analyzing a series of images in real-time" and within each image "segmenting the check to identify its outlines within the image in order to determine whether or not the edges of the check were substantially parallel with Luo's reference lines," resulting in "additional processing overhead and complexity on the customer's device" that persons of ordinary skill "considered computationally-intensive in 2009."

Req. 10 (quoting FWD 45 (discussing Ex. 2115 ¶ 35); PO Resp. 23; PO Surreply 23–24). Patent Owner argues that the Wells Fargo panel's finding that incorporating Yoon's automatic capture techniques into Nepomniachtchi's

IPR2021-01073 Patent 8, 977,571B1

system would add CPU overhead to the system should be applied to Petitioner's proposed combination of Acharya and Luo. *Id.* at 10–11. Patent Owner argues that we mischaracterized the Wells Fargo panel's analysis as being based on Nepomniachtchi's skew correction feature being incorporated into Nepomniachtchi's mobile device. *Id.* (citing PO Resp. 22; Ex. 2101, 26–27).

We did not misapprehend or overlook Patent Owner's argument. Instead, we fully considered that argument in the FWD and disagreed with it, noting that the Wells Fargo panel's findings were based on the particular technical features of prior art references not asserted in this proceeding. FWD 45–47. As to the evidence Patent Owner introduced in this proceeding, we found it "insufficient to establish that concerns over processing overhead would have dissuaded a skilled artisan from pursuing a combination of Acharya and Luo." Id. at 45. As to our understanding of the Wells Fargo panel's findings, that panel found that the petitioner asserted as a reason to combine, but did not prove, that adding pre-capture monitoring and auto-capturing features to Nepomniachtchi's mobile device would reduce the mobile device's computational burden. FWD 46–47; Ex. 2101, 25–28. Thus, the Wells Fargo petitioner had failed to persuasively support its theory of reduced computational burden and, therefore, did not meet its burden. FWD 46–47. The Wells Fargo panel found that the petitioner's admission that Nepomniachtchi's skew correction algorithm was computationally intensive was one factor undermining the petitioner's reduced computational burden theory. FWD 47; Ex. 2101, 31. As we explained in the Final Written Decision, those were arguments and evidence particular to the Wells Fargo IPR and the findings based on those arguments and evidence are not general findings of teachings away that would be

IPR2021-01073 Patent 8, 977,571B1

applicable to other prior art references, such as Acharya and Luo. FWD 47. Although Patent Owner might disagree with our ruling on its argument, mere disagreement is not a ground for rehearing.

Patent Owner also argues that we "rejected arguments that implementing Luo's automatic capture triggered on alignment with guide lines would replace human judgment by taking away the decision of when to capture the image," contrary to findings by the Wells Fargo panel that "an auto-capture system based solely on alignment, as Petitioner proposes here, would necessarily 'replac[e] the user's judgment that is based on numerous factors' and 'would not minimize the need for retaking the images, but would instead introduce additional errors." Req. 11 (quoting PO Resp. 25–27).

We considered Patent Owner's argument, but disagreed with it, explaining that the Wells Fargo panel based its findings on evidence (including admissions) and argument not presented in this proceeding. FWD 50–52. We considered the evidence that was presented in this proceeding and found that Patent Owner's concerns with replacing manual capture of images with auto capture would not have dissuaded a skilled artisan from combining Acharya and Luo. FWD 47–50. Again, although Patent Owner might disagree with our ruling on its argument, mere disagreement is not grounds for rehearing.

D. Patent Owner's Argument That We Improperly Ignored Evidence from the Parallel District Court Proceeding Undermining Petitioner's Obviousness Theory

Patent Owner argues that we improperly "disregarded and assigned zero weight to the district court testimony as related to 'enablement.'"

IPR2021-01073 Patent 8, 977,571B1

Req. 12. According to Patent Owner, "the cited testimony from Dr. Kia expressly addressed the question of 'predictability' of success from the perspective of one of skill in the art, which is a factual question germane to obviousness as well as enablement." *Id.* (citing *Honeywell Int'l Inc. v. Mexichem Amanco Holding S.A.*, 865 F.3d 1348, 1356 (Fed. Cir. 2017)).

Patent Owner further argues that "the Board misapprehended Patent Owner's arguments regarding what a [person having ordinary skill in the art] would understand to be necessary, in terms of image quality criteria, in order to produce a satisfactory automatic capture check deposit system." Req. 14. Specifically, Patent Owner argues it was not contending that the claims required multiple criterion; instead, Patent Owner argues that the Board should have considered Petitioner's arguments in the District Court that a person having ordinary skill in the art "would not have expected a mobile check deposit system to capture images 'suitable for deposit' without utilizing additional monitoring criteria beyond alignment." *Id.* (citing PO Resp. 38–40). According to Patent Owner, we should have considered the evidence relating to enablement from the District Court. *Id.* (citing *In re Fine*, 837 F.2d 1071, 1075 (Fed. Cir. 1988).

Contrary to Patent Owner's arguments, we did not misapprehend its argument. Whether it was Patent Owner arguing that multiple criteria were needed or Patent Owner arguing that we should consider Petitioner's arguments in the District Court that multiple criteria were needed, we fully addressed the argument. FWD 63–65. Either way, claim 1 only requires a single criterium and any argument to the contrary is inconsistent with the words of the claim and the prosecution history. *See id*.

Furthermore, as explained in the FWD, there is a difference between whether the full scope of a claim is enabled—the issue before the District

IPR2021-01073 Patent 8, 977,571B1

Court—and whether a claim would have been obvious—the issue before us. FWD 64–65; *see also Par Pharm., Inc. v. TWi Pharms., Inc.*, 120 F. Supp. 3d 468, 479 (D. Md. 2015) (finding claims both obvious and not enabled). 4 Moreover, as we indicated, Dr. Kia did not testify in this proceeding and we saw "little, if any, relevance by the testimony of a person who is not a witness in this proceeding regarding an issue that is not present in this proceeding." FWD 65. Accordingly, we gave no weight to that evidence, especially when, as discussed below, it was rejected by the jury. *Id.*

Additionally, if we did consider the evidence presented in the District Court that Patent Owner suggests, we would need to consider *all* of the evidence from the District Court. This would include the fact that the jury rejected Petitioner's argument. *See* FWD 65 (citing Tr. 46:3–47:18). It would also include the testimony of Patent Owner's expert that the full scope of the claims were enabled. *Id.* But, as we stated in the FWD, because "the issues are different so neither party is estopped and the expert testimony in the [District Court]—whether proffered by the successful Patent Owner or the unsuccessful Petitioner—is inapposite here." *Id.*

Moreover, we could not have overlooked Patent Owner's argument based on *Honeywell* or *Fine*. Patent Owner did not cite *Honeywell* or *Fine* in either its Response or Sur-reply. *See* PO Resp.; PO Sur-reply. We could not have overlooked or misapprehended arguments that were not previously made.

Patent Owner further argues that, when we concluded that "all that matters for our analysis is that a sufficient check image is sometimes

⁴ Our parenthetical on page 65 of the Final Written Decision inadvertently omitted the word "not" from in front of "enabled." Instead, the parenthetical should read "(finding claims both obvious and not enabled)."

IPR2021-01073 Patent 8, 977,571B1

produced," we overlooked the intended purpose of Acharya, remotely depositing checks. Req. 13 (quoting FWD 64–65). According to Patent Owner, a person having ordinary skill in the art would also have considered what is "required for adequate remote check imaging" and whether there was a reasonable expectation for success. *Id*.

Patent Owner's argument is based on a fundamental misunderstanding of the structure of the FWD. The quoted line from the FWD is from our analysis of whether the combination of Acharya and Luo teach the "depositing a check" and "passes the monitoring criteria" limitation. *See* FWD 56–66. As we explained in the FWD, the Federal Circuit has held that the combination only has to teach the limitation some of the time, not all of the time. FWD 63 (citing *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002 (Fed. Cir. 2016) ("[C]ombinations of prior art that sometimes meet the claim elements are sufficient to show obviousness."); *Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003) ("[A] prior art product that sometimes, but not always, embodies a claimed method nonetheless teaches that aspect of the invention."). That is what the quoted line relates to.

Elsewhere in the FWD, we fully addressed Patent Owner's arguments regarding why a person having ordinary skill in the art would not have combined Acharya and Luo, including an alleged lack of a reasonable expectation of success. FWD 28–56. This included addressing Patent Owner's argument that "[a] person having ordinary skill in the art would have expected Luo's single-criterion automatic capture technique to be less effective and undesirably burdensome on the mobile processor." FWD 33 (quoting PO Resp. 1–2), 44–70. Accordingly, we did not overlook the

IPR2021-01073 Patent 8, 977,571B1

purpose of Acharya or Patent Owner's argument that the combination with Luo would make Acharya inoperable for its intended purpose.

III.CONCLUSION

For the foregoing reasons, Patent Owner has not demonstrated that we misapprehended or overlooked its arguments and evidence presented during trial.

In summary,

Outcome of Decision on Rehearing:

Claim(s)	35 U.S.C	Reference(s)/Basis	Denied	Granted
	§			
1–3, 6, 9, 10,	103(a)	Acharya, Luo	1–3, 6, 9, 10,	
13			13	
4, 5	103(a)	Acharya, Luo,	4, 5	
		Nepomniachtchi		
12	103(a)	Acharya, Luo,	12	
		Yoon		
Overall			1–6, 9, 10, 12,	
Outcome			13	

Final Outcome of Final Written Decision after Rehearing:

	35 H G G		Claim(s)	Claim(s) Not
Claim(s)	U.S.C.	Reference(s)/Basis	Shown	Shown
	§		Unpatentable	Unpatentable
1–3, 6, 9,	103(a)	Acharya, Luo	1–3, 6, 9, 10,	
10, 13			13	
4, 5	103(a)	Acharya, Luo,	4, 5	
	, ,	Nepomniachtchi		
12	103(a)	Acharya, Luo,	12	
		Yoon		
Overall			1–6, 9, 10, 12,	
Outcome			13	

IPR2021-01073 Patent 8, 977,571B1

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED Patent Owner's Request for Rehearing is denied.

IPR2021-01073 Patent 8, 977,571B1

PETITIONER:

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Paper 73 Date: April 28, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

IPR2021-01070 Patent 8,699,779 B1

Before DAVID C. McKONE, SCOTT B. HOWARD, and JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

 ${\it McKONE}, {\it Administrative Patent Judge}.$

DECISION

Denying Patent Owner's Request for Rehearing of Final Written Decision $37 C.F.R. \ \S \ 42.71(d)$

IPR2021-01070 Patent 8,699,779 B1

I. INTRODUCTION

PNC Bank N.A. ("Petitioner") filed a Petition (Paper 3, "Pet.") requesting *inter partes* review of claims 1, 2, 7–10, and 15–17 of U.S. Patent No. 8,699,779 B1 (Ex. 1001, "the '779 patent"). Pet. 3. United Services Automobile Association ("Patent Owner") filed a Preliminary Response (Paper 8). Pursuant to 35 U.S.C. § 314, we instituted this proceeding. Paper 20 ("Dec."). ²

Patent Owner filed a Patent Owner's Response (Paper 40, "PO Resp."), Petitioner filed a Reply to the Patent Owner's Response (Paper 43, "Reply"), and Patent Owner filed a Sur-reply to the Reply (Paper 58, "Surreply"). A consolidated oral argument was held in this proceeding and IPR2021-01073 on October 25, 2022. Paper 67 ("Tr.").

Upon consideration of the Petition, Patent Owner Response, Reply, and Sur-reply, we issued a Final Written Decision determining that claims 1, 2, 7–10, and 15–17 of the '779 Patent are unpatentable. Paper 68 ("FWD" or "Decision"). Patent Owner filed a Request for Rehearing of the FWD. Paper 70 ("Req."). Patent Owner also submitted a request for Precedential Opinion Panel ("POP") review (Ex. 3003; Paper 71), which was denied (Paper 72). We now consider Patent Owner's Request for Rehearing. For the reasons given below, we decline to modify our Decision.

¹ A public version of the Preliminary Response is filed as Paper 9.

² A public version of the Institution Decision is filed as Paper 25.

IPR2021-01070 Patent 8,699,779 B1

II. ANALYSIS

A. Legal Background

The burden of showing that the FWD should be modified is on Patent Owner, the party challenging the Decision. *See* 37 C.F.R. § 42.71(d) (2021). In addition, "[t]he request must specifically identify all matters the party believes [we] misapprehended or overlooked, and the place where each matter was previously addressed in a motion, an opposition, a reply, or a surreply." *Id*.

B. Patent Owner's Argument that We Misapplied the Law of Obviousness

Patent Owner contends that we misapplied *Graham v. John Deere Co.* of *Kansas City*, 383 U.S. 1 (1966), by not properly assessing the scope and the content of the prior art and the differences between the prior art and the claims at issue. Req. 1.

In the FWD, we determined that the challenged claims were unpatentable as obvious over a combination of Acharya (Ex. 1003) and Luo (Ex. 1004), prior art references asserted by Petitioner. FWD 8, 60. We also noted that Patent Owner cited extensively to Yoon (Ex. 2008), Nepomniachtchi (Ex. 2105), ImageNet (Ex. 1004, pp. 30–44), and Blackson (Ex. 2113) in its Patent Owner Response and Sur-reply. *Id.* at 8–9.

Patent Owner argues that we "incorrectly limited [our] analysis to the particular references that Petitioner happened to select as part of its obviousness grounds," and "consistently disregarded" Patent Owner's evidence "as being of 'marginal' or no relevance on the basis that they were not 'asserted by Petitioner in this proceeding' (or in cases where the references were in fact asserted by Petitioner, that they were not asserted for

IPR2021-01070 Patent 8,699,779 B1

a particular ground as part of an explicit combination)." Req. 1–2. Patent Owner argues that we did not consider the prior art as a whole, and that we should not have given Petitioner's prior art greater weight than given to Patent Owner's prior art. Id. at 4–5. In particular, "Patent Owner consistently argued throughout the papers that the Board should consider the teachings of other references, such as Nepomniachtchi, as leading the person of ordinary skill away from the claimed invention when the prior art as a whole is considered." *Id.* at 5 n.2 (citing PO Resp. 25–29, 47, 52–56). Patent Owner cites In re Dow Chemical Co., 837 F.2d 469 (Fed. Cir. 1988), to argue that we must consider the full field of the invention and that a skilled artisan is charged with the knowledge of the entire body of technical literature, including knowledge that might lead away from the claimed invention. Id. at 5-6. According to Patent Owner, "[h]ad the Board accorded the appropriate weight to the prior art as a whole, rather than assigning 'marginal' relevance to references not part of the specific asserted combinations laid out in the [P]etition, the evidence would have led the Board to a different result." *Id.* at 6.

In particular, Patent Owner argues that

by disregarding the teachings of Nepomniachtchi (or considering [it] as merely an "alternative solution" in the art), the Board failed to apprehend that the issue identified by Luoprojective distortion—was not a significant problem for check deposit systems known to a [person of ordinary skill in the art] at the time of the invention due to the availability of post-processing techniques that were especially suited to correcting projective distortion, even more so than other image quality defects.

Id. at 7 (citing PO Resp. 45–47). Patent Owner continues:

by failing to apprehend that the perceived benefit to a [person of ordinary skill in the art] of incorporating Luo's technique

IPR2021-01070 Patent 8,699,779 B1

into Acharya was minimal at best, the Board also failed to apprehend the significance of the drawbacks of the combination identified by Patent Owner and its expert, such as increased CPU [central processing unit] burden and higher risk of errors due to automatic capture that may occur at the wrong time.

Id. at 7–8

In *Dow Chemical*, the United States Court of Appeals for the Federal Circuit stated:

In determining whether such a suggestion can fairly be gleaned from the prior art, the full field of the invention must be considered; for the person of ordinary skill is charged with knowledge of the entire body of technological literature, including that which might lead away from the claimed invention.

837 F.2d at 473. In *Dow Chemical*, the applicant argued that the Office's asserted references themselves did not show that the references should or could be combined, and that additional evidence led away from the asserted combination because it showed that the combination would not have worked and would have had many problems. *Id.* at 471–72. According to the Federal Circuit, "[i]t is indeed pertinent that these references teach against the present invention. Evidence that supports, rather than negates, patentability must be fairly considered." *Id.* at 473.

Contrary to Patent Owner's assertions, we fully considered, at length, Patent Owner's evidence, including Yoon, Nepomniachtchi, ImageNet, and Blackson. *See*, *e.g.*, FWD 32–44. For example, we expressly considered whether projective distortion, identified by Luo as a problem it solved, was a significant problem in light of other solutions, such as Nepomniachtchi. FWD 36–41. In particular, we considered Patent Owner's arguments that Nepomniachtchi teaches techniques for correcting projective distortion at a server that receives an image of a check, rather than at the device that

IPR2021-01070 Patent 8,699,779 B1

captures the image, and declined to find "that post-capture image correction was the preferred approach, that post-capture image correction was preferred to preventing distortion at the time of image capture, or that these two techniques would have been mutually exclusive." Id. at 40. And even if it was, we found that a skilled artisan would have had reasons (stated expressly in Luo) to pursue other approaches. *Id.* Specifically, we found that Acharya teaches using optical character recognition in capturing check images, that Luo expressly states that its technique reduces projective distortion and improves optical character recognition, and that a skilled artisan would have recognized that Luo's solution could be used to improve check processing, as in Acharya's system, in the same manner. *Id.* at 34 (citing Ex. 1003, 7:36–41; Ex. 1004, 7; Ex. 1002 (Declaration of Petitioner's expert) ¶ 63). We credited the testimony of Petitioner's expert as consistent with the prior art. FWD 36. In any case, as the Federal Circuit has held, its case law "does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention." In re Fulton, 391 F.3d 1195, 1200 (Fed. Cir. 2004).

As to Blackson, we considered it fully but found that it was less relevant because it described image capture on automated teller machine hardware rather than mobile devices. FWD 41. As to ImageNet, we found that it was simply an example of art using manual capture, rather than automatic capture; that it did not show that manual capture was the preferred method in the art; and that it did not criticize, discredit, or discourage automatic capture. *Id.* at 34.

We also expressly considered whether Patent Owner's art teaches away from Petitioner's combination of Acharya and Luo and found that it

IPR2021-01070 Patent 8,699,779 B1

does not. FWD 34 (finding that "Patent Owner points to nothing in Nepomniachtchi or ImageNet that criticized, discredited, or would have discouraged automatic capture of check images"), 42 (finding that "Patent Owner does not point to any statements in Nepomniachtchi, Blackson, Yoon, or ImageNet (references not relied upon by Petitioner) that would discourage a user from combining Acharya and Luo, or lead a skilled artisan in a direction divergent from that combination"). In short, we found that Patent Owner's references, e.g., Nepomniachtchi, Blackson, Yoon, and ImageNet, illustrated other examples of solutions in the art, but did not include teachings that would have discouraged a combination of Acharya and Luo. Id. at 34, 42. Cf. Fulton, 391 F.3d at 1201 ("The prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed in the '198 application. . . . Accordingly, mere disclosure of alternative designs does not teach away.").

We also expressly considered, again, at length, Patent Owner's arguments, relying primarily on Nepomniachtchi and the testimony of its expert, that a skilled artisan would have been discouraged from combining Acharya and Luo because of increased CPU burden and higher risk of errors due to automatic capture that may occur at the wrong time. FWD 42–55. We disagreed with those arguments. For example, we found that "Patent Owner's evidence is insufficient to establish that concerns over processing overhead would have dissuaded a skilled artisan from pursuing a combination of Acharya and Luo." *Id.* at 44.

In sum, we did not overlook the prior art references advanced by Patent Owner or the arguments it made in advancing those references. We

IPR2021-01070 Patent 8,699,779 B1

also did not misapprehend the teachings of those references or Patent Owner's arguments as to what they teach. Rather, we disagreed with Patent Owner's arguments and found that Patent Owner's prior art references do not teach what Patent Owner asserts that they teach. For that reason, we found that those prior art references had marginal, if any, relevance. Although Patent Owner might disagree with our findings, such disagreement is not a basis for rehearing.

C. Patent Owner's Argument that We Failed to Justify a Departure from a Prior Panel's Factual Findings

In Wells Fargo Bank, N.A. v. United Services Automobile Association, IPR2019-01083 (the "Wells Fargo IPR"), a panel of the Board determined that claims of the '779 patent were not unpatentable as obvious over Nepomniachtchi³, Yoon, and Acharya. Ex. 1083 (Final Written Decision in the Wells Fargo IPR). Patent Owner argues that the Wells Fargo panel determined that it would not have been obvious to modify a pre-existing remote check deposit system to automatically capture images when the edges of a document align with an alignment guide. Req. 8. Patent Owner contends that we "reached the opposite conclusion, but failed to adequately explain why [we] disagreed with the prior panel's analysis of common facts." Id. Contrary to Patent Owner's argument, we provided extensive

³ In the Wells Fargo IPR, the Board considered the teachings of Nepomniachtchi, US 7,778,457 B2, issued August 17, 2012 (Ex. 2012). Patent Owner contends that "[t]he Nepomniachtchi reference discussed here is substantively identical to the Nepomniachtchi patent that was used as the base reference in the prior [Wells Fargo IPR]—both claim priority to the same provisional application—and contain similar disclosures." PO Resp. 9 n.3.

IPR2021-01070 Patent 8,699,779 B1

explanation of our Decision in the context of the Wells Fargo IPR. *See, e.g.,* FWD 28 n.10, 39 n.14, 43 n.16, 44–46, 49–51, 52 n.17.

Referring to the arguments it made pursuant to 35 U.S.C. § 325(d) in the Preliminary Response (Paper 8), Patent Owner argues that "the instant petition involves the same or substantially the same art, the same or substantially the same arguments, and the same relevant factual issues that were evaluated by the Board in [the Wells Fargo IPR]," and that Petitioner made no showing of material error by the Wells Fargo panel. Req. 9. Patent Owner argues that we "should have deferred to the Wells Fargo IPR panel's evaluation of pertinent prior art such as Nepomniachtchi." *Id.* at 9–10.

We explained in the Institution Decision why Patent Owner's Section 325(d) argument was unpersuasive. Paper 20, at 30–34. To the extent Patent Owner wants us to revisit our determination under Section 325(d), it should have requested rehearing of our Institution Decision. It is too late to do so now.

Patent Owner also argues that we rejected its argument that implementing automatic capture techniques into Acharya would require "analyzing a series of images in real-time" and within each image "segmenting the check to identify its outlines within the image in order to determine whether or not the edges of the check were substantially parallel with Luo's reference lines," resulting in "additional processing overhead and complexity on the customer's device" that persons of ordinary skill "considered computationally-intensive in 2009."

Id. at 10 (quoting FWD 44; citing Ex. 2115 ¶ 35; PO Resp. 53–54; Sur-reply 19–20). Patent Owner argues that the Wells Fargo panel's finding that incorporating Yoon's automatic capture techniques into Nepomniachtchi's system would add CPU overhead to the system should be applied to Petitioner's proposed combination of Acharya and Luo. *Id.* at 10–11. Patent

IPR2021-01070 Patent 8,699,779 B1

Owner argues that we mischaracterized the Wells Fargo panel's analysis as being based on Nepomniachtchi's skew correction feature being incorporated into Nepomniachtchi's mobile device. *Id.* (citing Ex. 2108, 37–38).

We did not misapprehend or overlook Patent Owner's argument. Instead, we fully considered that argument in the FWD but disagreed with it, noting that the Wells Fargo panel's findings were based on the particular technical features of prior art references not asserted in this proceeding. FWD 44-46. As to the evidence Patent Owner introduced in this proceeding, we found it "insufficient to establish that concerns over processing overhead would have dissuaded a skilled artisan from pursuing a combination of Acharya and Luo." Id. at 44. As to our understanding of the Wells Fargo panel's findings, that panel found that the petitioner asserted as a reason to combine, but did not prove, that adding pre-capture monitoring and auto-capturing features to Nepomniachtchi's mobile device would reduce the mobile device's computational burden. FWD 45; Ex. 2108, 28– 31. Thus, the Wells Fargo petitioner had failed to persuasively support its theory of reduced computational burden and, therefore, did not meet its burden. FWD 45–46. The Wells Fargo panel found that the petitioner's admission that Nepomniachtchi's skew correction algorithm was computationally intensive was one factor undermining the petitioner's reduced computational burden theory. FWD 46; Ex. 2108, 33. As we explained in the Final Written Decision, those were arguments and evidence particular to the Wells Fargo IPR, and the findings based on those arguments and evidence are not general findings of teaching away that would be applicable to other prior art references, such as Acharya and Luo. FWD 46.

IPR2021-01070 Patent 8,699,779 B1

Although Patent Owner might disagree with our ruling on its argument, mere disagreement is not a ground for rehearing.

Patent Owner also argues that we "rejected arguments that implementing Luo's automatic capture triggered on alignment with guide lines would replace human judgment by taking away the decision of when to capture the image," contrary to findings by the Wells Fargo panel that "an auto-capture system based solely on alignment, as Petitioner proposes here, would necessarily 'replac[e] the user's judgment that is based on numerous factors' and 'would not minimize the need for retaking the images, but would instead introduce additional errors." Req. 11 (quoting PO Resp. 29–30; citing Ex. 2108, 61).

We considered Patent Owner's argument, but disagreed with it, explaining that the Wells Fargo panel based its findings on evidence (including admissions) and argument not presented in this proceeding. FWD 49–51. We considered the evidence that was presented in this proceeding and found that Patent Owner's concerns with replacing manual capture of images with auto capture would not have dissuaded a skilled artisan from combining Acharya and Luo. FWD 46–49. Again, although Patent Owner might disagree with our ruling on its argument, mere disagreement is not a ground for rehearing.

III.CONCLUSION

For the foregoing reasons, Patent Owner has not demonstrated that we misapprehended or overlooked its arguments and evidence presented during trial.

IPR2021-01070 Patent 8,699,779 B1

Outcome of Decision on Rehearing:

Claim(s)	35 U.S.C	Reference(s)/Basis	Denied	Granted
	§			
1, 2, 7–10,	103(a)	Acharya, Luo	1, 2, 7–10,	
15–17		·	15–17	
Overall			1, 2, 7–10,	
Outcome			15–17	

Final Outcome of Final Written Decision after Rehearing:

	35		Claim(s)	Claim(s) Not
Claim(s)	U.S.C.	Reference(s)/Basis	Shown	Shown
, ,	§		Unpatentable	Unpatentable
1, 2, 7–10,	103(a)	Acharya, Luo	1, 2, 7–10, 15–17	
15–17			15–17	
Overall			1, 2, 7–10,	
Outcome			15–17	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED Patent Owner's Request for Rehearing is denied.

IPR2021-01070 Patent 8,699,779 B1

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(12) United States Patent

Bueche, Jr. et al.

(10) Patent No.: US 8,977,571 B1 (45) Date of Patent: *Mar. 10, 2015

(54) SYSTEMS AND METHODS FOR IMAGE MONITORING OF CHECK DURING MOBILE DEPOSIT

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 581 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: 12/545,127

(22) Filed: Aug. 21, 2009

(51) **Int. Cl. G06Q 40/00** (2012.01) (52) **U.S. Cl.**

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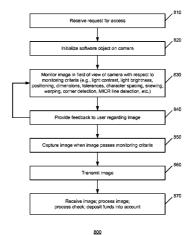
(Continued)

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(57) ABSTRACT

An image of a check that is in the field of view of a camera is monitored prior to the image of the check being captured. The camera is associated with a mobile device. When the image of the check in the field of view passes monitoring criteria, an image may be taken by the camera and provided from the mobile device to a financial institution. The image capture may be performed automatically as soon as the image of the check is determined to pass the monitoring criteria. The check may be deposited in a user's bank account based on the image. Any technique for sending the image to the financial institution may be used. Feedback may be provided to the user of the camera regarding the image of the check in the field of view.

20 Claims, 8 Drawing Sheets



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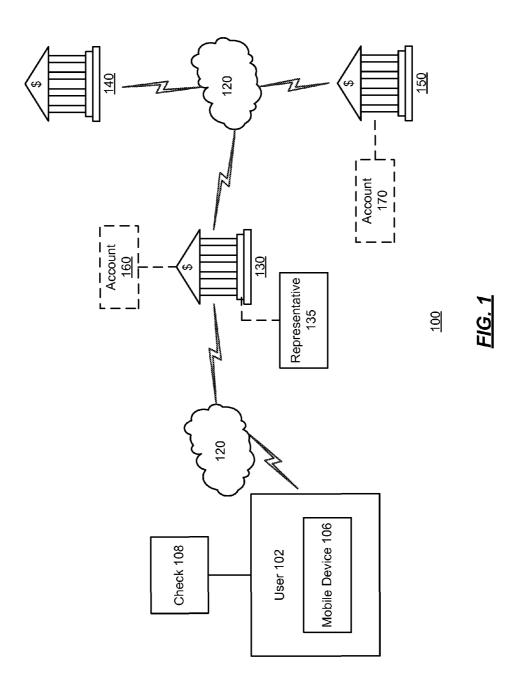
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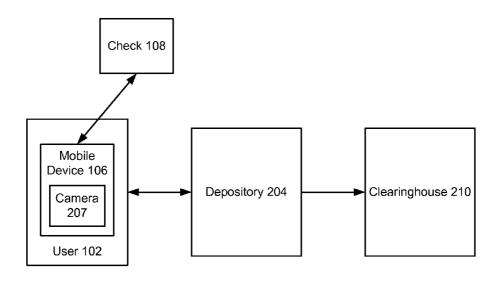
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U.S. Patent Mar. 10, 2015 Sheet 1 of 8 US 8,977,571 B1



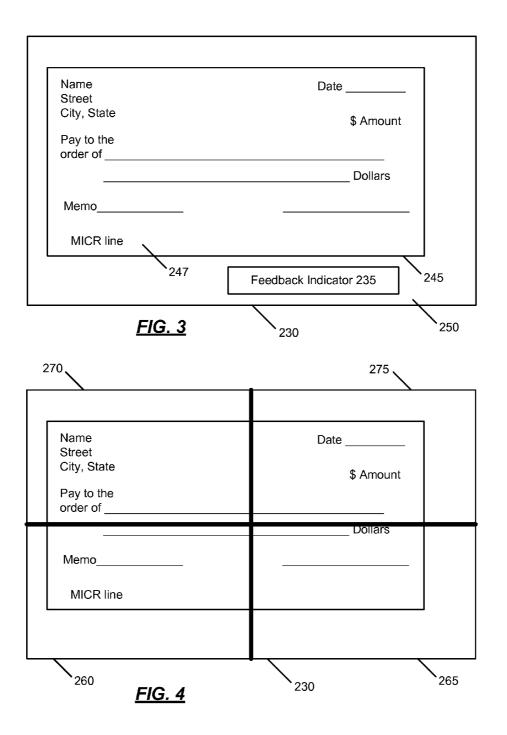
U.S. Patent Mar. 10, 2015 Sheet 2 of 8 US 8,977,571 B1



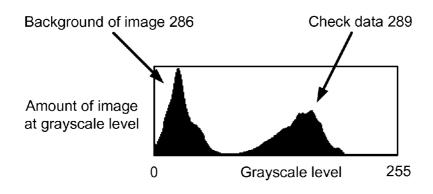
<u>200</u>

FIG. 2

U.S. Patent Mar. 10, 2015 Sheet 3 of 8 US 8,977,571 B1

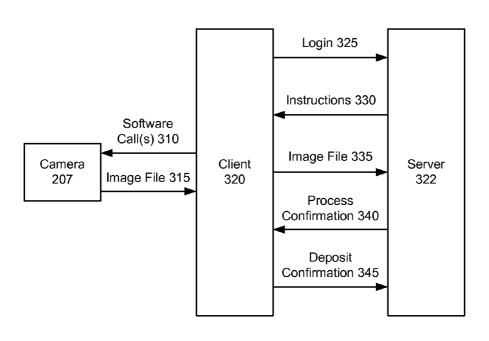


U.S. Patent Mar. 10, 2015 Sheet 4 of 8 US 8,977,571 B1



<u>280</u>

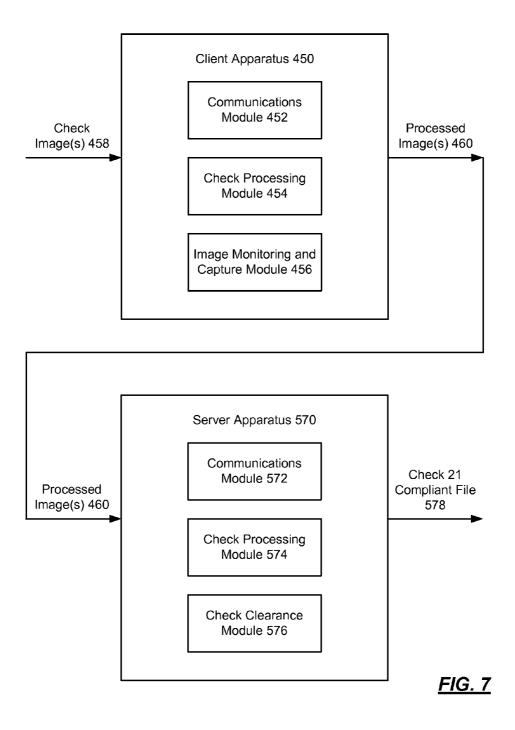
FIG. 5



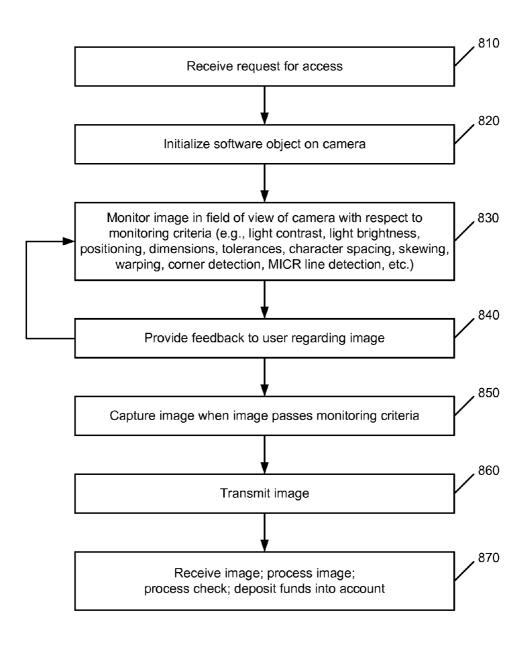
<u>300</u>

FIG. 6

U.S. Patent Mar. 10, 2015 Sheet 5 of 8 US 8,977,571 B1



U.S. Patent Mar. 10, 2015 Sheet 6 of 8 US 8,977,571 B1



<u>800</u>

FIG. 8

U.S. Patent Mar. 10, 2015 Sheet 7 of 8 US 8,977,571 B1

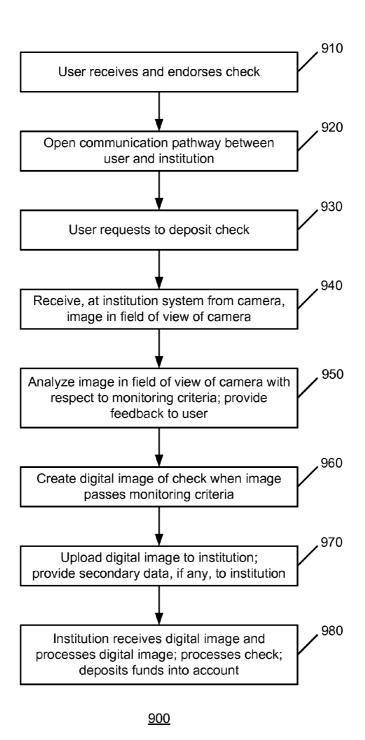
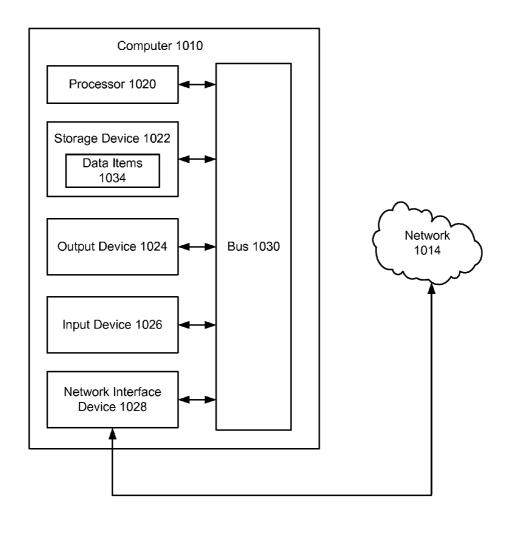


FIG. 9

U.S. Patent Mar. 10, 2015 Sheet 8 of 8 US 8,977,571 B1



<u>1000</u>

FIG. 10

US 8,977,571 B1

1

SYSTEMS AND METHODS FOR IMAGE MONITORING OF CHECK DURING MOBILE DEPOSIT

BACKGROUND

Checks typically provide a safe and convenient method for an individual such as a payor to transfer funds to a payee. To use a check, the individual usually opens a checking account, or other similar account, at a financial institution and deposits funds, which are then available for later withdrawal. To transfer funds with a check, the payor usually designates a payee and an amount payable on the check. In addition, the payor often signs the check. Once the check has been signed, it is usually deemed negotiable, meaning the check may be validly transferred to the payee upon delivery. By signing and transferring the check to the payee, the payor authorizes funds to be withdrawn from the payor's account on behalf of the payee.

While a check may provide a payor with a convenient and secure form of payment, receiving a check may put certain 20 burdens on the payee, such as the time and effort required to deposit the check. For example, depositing a check typically involves going to a local bank branch and physically presenting the check to a bank teller. To reduce such burdens for the payee, systems and methods have been developed to enable the remote deposit of checks. For example, the payee may capture a digital image of a check using a mobile device. The financial institution may then receive from the payee the digital image of the check. The financial institution may then use the digital image to credit funds to the payee. However, such a technique requires the efficient and accurate detection and extraction of the information pertaining to a check in the digital image. Capturing a digital image at a mobile device that allows for subsequent detection and extraction of the information from the digital image is difficult.

SUMMARY

An image of a check that is in the field of view of a camera is monitored prior to the image of the check being captured. The camera is associated with a mobile device. The monitoring may be performed by the camera, the mobile device, and/or a financial institution that is in communication with the mobile device. When the image of the check in the field of view passes monitoring criteria, an image may be taken by the camera and provided from the mobile device to a financial institution. The check may be deposited in a user's bank account based on the image. Any technique for sending the image to the financial institution may be used.

In an implementation, the image capture may be performed automatically by the camera, the mobile device, and/or the financial institution as soon as the image of the check is determined to pass the monitoring criteria. In an implementation, feedback may be provided to the user of the camera regarding the image of the check in the field of view. The user may reposition the check and/or the camera, for example, responsive to the feedback. Alternatively, the user may capture an image of the check responsive to the feedback.

This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing summary, as well as the following detailed description of illustrative embodiments, is better understood

2

when read in conjunction with the appended drawings. For the purpose of illustrating the embodiments, there are shown in the drawings example constructions of the embodiments; however, the embodiments are not limited to the specific methods and instrumentalities disclosed. In the drawings:

FIG. 1 is a block diagram of an implementation of a system in which example embodiments and aspects may be implemented:

FIG. 2 shows a high-level block diagram of an implementation of a system that may be used for the deposit of a check;

FIG. 3 is a diagram of an example image comprising a check image, a background image, and feedback;

FIG. 4 is a diagram of an example image divided into segments that may be used for monitoring the image;

FIG. 5 is a diagram of an example histogram for a segment of an image comprising check data and background data;

FIG. 6 shows a data flow diagram of a system for the deposit of a check, in accordance with an example embodiment:

FIG. 7 shows a block diagram of a client apparatus and a server apparatus for the deposit of a check, in accordance with an example embodiment;

FIG. **8** is an operational flow of an implementation of a method that may be used for deposit of a check using image monitoring of the check;

FIG. 9 is an operational flow of another implementation of a method that may be used for deposit of a check using image monitoring of the check; and

FIG. 10 is a block diagram of an example computing environment in which example embodiments and aspects may be implemented.

DETAILED DESCRIPTION

In the following detailed description of example embodiments, reference is made to the accompanying drawings, which form a part hereof and in which is shown, by way of illustration, specific embodiments in which the example methods, apparatuses, and systems may be practiced. It is to be understood that other embodiments may be used and structural changes may be made without departing from the scope of this description.

FIG. 1 is a block diagram of an implementation of a system 100 in which example embodiments and aspects may be implemented. System 100 may include an account owner, referred to herein as a user 102, and financial institutions 130, 140, and 150, which may be any type of entity capable of processing a transaction involving a negotiable instrument. For example, financial institutions 130, 140, and 150 may be a retail bank, an investment bank, an investment company, a regional branch of the Federal Reserve, a clearinghouse bank, and/or a correspondent bank.

A negotiable instrument typically includes a type of contract that obligates one party to pay a specified sum of money to another party. Negotiable instrument as used herein is an unconditioned writing that promises or orders payment of a fixed amount of money. One example of a negotiable instrument is a check. The check may be taken by the receiving party and deposited into an account at a financial institution of the receiving party. The receiving party may endorse the check and then present it for deposit at a bank branch, via an automated teller machine (ATM), or by using remote deposit. Other examples of negotiable instruments include money orders, cashier's checks, drafts, bills of exchange, promissory notes, and the like. A money order is a trusted financial instrument that is a payment order for a pre-specified amount of money. A cashier's check (also known as a bank check,

US 8,977,571 B1

official check, teller's check, bank draft or treasurer's check) is a check guaranteed by a bank and may be purchased from a bank.

The user 102 may be an individual or entity who owns account 160 that may be held at financial institution 130. Account 160 may be any type of deposit account for depositing funds, such as a savings account, a checking account, a brokerage account, and the like. The user 102 may deposit a check 108 or other negotiable instrument in the account 160 either electronically or physically. The financial institution 1 130 may process and/or clear the check 108 or other negotiable instrument. The user 102 may communicate with financial institution 130 by way of communications network 120 such as an intranet, the Internet, a local area network (LAN), a wide area network (WAN), a wireless fidelity (WiFi) net- 15 work, a public switched telephone network (PSTN), a cellular network, a voice over Internet protocol (VoIP) network, and the like. The user 102 may communicate with financial institution 130 by phone, email, instant messaging, text messaging, web chat, facsimile, mail, and the like. Financial institu- 20 tions 130, 140, and 150 also may communicate with each other by way of communications network 120.

In an implementation, the user 102 may receive payment from another individual such as a payor in the form of a check 108 or other negotiable instrument that is drawn from account 25 170 at financial institution 150. The user 102 may endorse the check 108 (e.g., sign the back of the check 108) and indicate an account number on the check 108 for depositing the funds. It is noted that although examples described herein may refer to a check, the techniques and systems described herein are contemplated for, and may be used for, deposit of any negotiable instrument. Similarly, the techniques and systems described herein are contemplated for and may be used with any form or document whose image may be captured with a camera or other imaging device of a mobile device for subsequent storage and/or processing.

As described further herein, a digital image of a check or other negotiable instrument may be provided from a user to a financial institution, and the digital image may be processed and funds associated with the check or negotiable instrument 40 in the digital image may be deposited in a user's bank account. The user 102 may deposit the check 108 into account 160 by making a digital image of the check 108 and sending the image file containing the digital image to financial institution 130. For example, after endorsing the check 108, the 45 user 102 may use a mobile device 106 that comprises a camera to convert the check 108 into a digital image by taking a picture of the front and/or back of the check 108. The mobile device 106 may be a mobile phone (also known as a wireless phone or a cellular phone), a personal digital assistant (PDA), 50 or any handheld computing device, for example. Aspects of an example mobile device are described with respect to FIG.

To increase the likelihood of capturing a digital image of the check 108 that may be readable and processed such that 55 the check 108 can be cleared, the image is monitored for compliance with one or more monitoring criteria, prior to the image of the check 108 being captured. The monitoring criteria may be directed to proper lighting and/or framing of the check 108 in an image of the check 108 that will be captured and presented for clearing of the check 108. An application may monitor whether the check 108 is sufficiently within the frame of the camera and has a high enough quality for subsequent processing. The monitoring is performed with respect to the image as it appears in the field of view of the camera of the mobile device 106. The field of view is that part of the world that is visible through the camera at a particular

4

position and orientation in space; objects outside the field of view when the image is captured are not recorded in the image. The monitoring criteria may be based on one or more of light contrast on the image, light brightness of the image, positioning of the image, dimensions, tolerances, character spacing, skewing, warping, corner detection, and MICR (magnetic ink character recognition) line detection, as described further herein. In an implementation, one or more histograms may be determined using the image being monitored. The histograms may be used in conjunction with monitoring criteria, as described further herein.

The monitoring may be performed by the camera, the mobile device 106, and/or a financial institution that is in communication with the mobile device 106. When the image of the check 108 in the field of view passes the monitoring criteria, an image may be taken by the camera and provided from the mobile device 106 to a financial institution. By ensuring that the image of the check passes monitoring criteria during pre-image capture monitoring, the number of nonconforming images of checks is reduced during presentment of the images to a financial institution for processing and clearing. In an implementation, feedback may be provided to the user 102 regarding the image of the check in the field of view. Based on the feedback, the user 102 may reposition the check 108 and/or the camera, for example, or may capture an image of the check 108.

In an implementation, the image capture may be performed automatically by the camera, the mobile device 106, and/or the financial institution as soon as the image of the check 108 is determined to pass the monitoring criteria. Alternatively, the user 102 may manually instruct the camera to perform the image capture (e.g., by pressing a button the camera or the mobile device 106) after the user 102 receives an indication or other feedback that the image passes the monitoring criteria.

In an implementation, the user 102 may send the digital image(s) to financial institution 130 using the mobile device 106. Any technique for sending a digital image to financial institution 130 may be used, such as providing a digital image to a website associated with financial institution 130 from storage, emailing a digital image to financial institution 130, or sending a digital image in a text message or instant message, for example.

Financial institution 130 may receive a digital image representing the check 108 and may use any known image processing software or other application(s) to obtain the relevant data of the check 108 from the digital image. Financial institution 130 may determine whether the financial information associated therewith may be valid. For example, financial institution 130 may include any combination of systems and subsystems such as electronic devices including, but not limited to, computers, servers, databases, or the like. The electronic devices may include any combination of hardware components such as processors, databases, storage drives, registers, cache, random access memory (RAM) chips, data buses, or the like and/or software components such as operating systems, database management applications, or the like. According to an embodiment, the electronic devices may include a network-based server that may process the financial information and may receive the digital image from the user 102

The electronic devices may receive the digital image and may perform an analysis on the quality of the digital image, the readability of the data contained therein, or the like. For example, the electronic devices may determine whether the account number, amount payable, and the like may be readable such that it may be parsed or otherwise obtained and processed by the financial institution to credit an account 160

US 8,977,571 B1

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associated with the user 102 and debit an account associated with the payor. In an implementation, a representative 135 of financial institution 130 may provide assistance to the user 102 and may provide assistance in determining whether the financial information may be readable and/or of a good enough quality to be processed.

Upon receipt and approval of the digital image, financial institution 130 may credit the funds to account 160. Financial institution 130 may clear the check 108 by presenting a digital image of the check 108 captured from the digital image to an 10 intermediary bank, such as a regional branch of the Federal Reserve, a correspondent bank, and/or a clearinghouse bank. For example, the check 108 may be cleared by presenting the digital image to financial institution 140, which may be a regional branch of the Federal Reserve, along with a request 15 for payment. Financial institutions 130 and 150 may have accounts at the regional branch of the Federal Reserve. Financial institution 130 may create a substitute check using the image provided by the user 102 and present the substitute check to financial institution 140 for further processing. Upon 20 receiving the substitute check, financial institution 140 may identify financial institution 150 as the paying bank (e.g., the bank from which the check 108 is drawn). This may be accomplished using a nine digit routing number located on the bottom left hand corner of the check. A unique routing 25 number is typically assigned to every financial institution in the United States. Financial institution 140 may present the substitute check to financial institution 150 and request that the check be paid. If financial institution 150 verifies the check (i.e., agrees to honor the check), financial institution 30 140 may then settle the check by debiting funds from financial institution 150 and crediting funds to financial institution 130. Financial institution 150 may then debit funds from account 170.

It will be appreciated that the preceding examples are for 35 purposes of illustration and explanation only, and that an embodiment is not limited to such examples. For example, financial institution 150 may be a correspondent bank (i.e., engaged in a partnership with financial institution 130). Thus, financial institution 130 may bypass the regional branch of 40 the Federal Reserve and clear the check directly with financial institution 150. In addition, account 160 and account 170 may both be held at financial institution 130, in which case the check 108 may be cleared internally.

In an implementation, the mobile device 106 may comprise 45 a video source such as a video camera, a web camera, or a video-enabled phone, for example, to obtain a video of the check 108. A frame of the video may be obtained and monitored with respect to monitoring criteria, as described further herein. The mobile device 106 and/or the institution may 50 obtain the frame and monitor the frame, depending on an implementation. Generation of a live video of a check 108 is not limited to a video camera, a web camera, and a videoenabled phone, and it is contemplated that any device that is capable of generating a live video may be used to make a 55 video of the check 108 which may be monitored in real-time with respect to monitoring criteria. Additional devices that may be used in the generation and/or transmission of a live video include a web-enabled video computing device, a mobile phone, a camcorder, and a computer camera, for 60

FIG. 2 shows a high-level block diagram of an implementation of a system 200 that may be used for the deposit of a check, such as the check 108. As described further herein, the user 102 may deposit the funds of the check 108 using the 65 camera functionality in the mobile device 106. In the example of one person giving a check to another person, this would

6

enable the receiving party to deposit the funds at that time, without physically visiting an ATM or a bank branch.

In an implementation, the mobile device 106 may comprise a camera 207, such as a digital camera. Such a mobile device may be called a camera phone. The mobile device 106, through the camera 207, has the ability to take or capture a picture or digital image of the check 108 or other negotiable instrument. The camera 207 may take an image of the front of the check 108. Alternatively, the camera 207 may take an image of both the front and the back of the check 108. The back of the check may provide endorsement verification, such as the signature of the person or party the check is made out to.

In an implementation, prior to an image in the field of view of the camera 207 being captured by the camera 207, the image may be monitored with respect to monitoring criteria, e.g., using a software application running on the mobile device 106. Feedback based on the monitoring of the image may be provided to the user 102 to assist the user 102 in positioning the check 108 so that the image of the check 108 may be captured in such a manner that it may be more easily processed and cleared during subsequent operations, such as those involving one or more financial institutions.

A depository 204 may include a bank in which the user 102 has a deposit account; however, the present disclosure is not limited to just banks. Alternatively, a third party may act as the depository 204 providing functionality to a plurality of users without regard to the bank at which they have deposit accounts, or whether their individual bank allows for the methods and systems described herein. The depository 204, in an implementation, after receiving the image(s) of the check 108 from the user 102, may use a clearinghouse 210 to perform the check clearing operations. As described with respect to the system 100 of FIG. 1, check clearing operations are used by banks to do the final settlement of the check 108, such as removing funds from the account of the payor and transferring those funds to the user's bank. The user's bank may choose to make the funds available to the user 102 immediately and take on the risk that the check 108 does not clear. However, for various reasons, the bank may only make those funds available to the user 102 after the check 108 finally clears.

In an implementation, the user 102 may place the check 108 on a background and generate a digital image comprising an image of the check (e.g., a check image) and a portion of the background (e.g., a background image) using the camera 207. Any background may be used, although a dark background or a consistently colored background may provide more optimal results. It is noted that although examples and implementations described herein may refer to a check image and check data, the term "check image" may refer to any foreground image in a digital image (as opposed to the background image) and the term "check data" may refer to any foreground data in a digital image (as opposed to background data). Thus, the "check image" and the "check data" may refer to the foreground image and foreground data in implementations involving any negotiable instrument, form, or document.

In an implementation, the image being monitored in the field of view of the camera 207 comprises check data and background data. The check data pertains to the check image and the background data pertains to the background image (e.g., the background on which the check image is disposed).

FIG. 3 is a diagram of an example image 230 comprising a check image 247, a background image 250, and a feedback indicator 235 providing feedback to the user 102. The image 230 may be generated by an imaging device associated with the mobile device 106, such as the camera 207. An edge 245

US 8,977,571 B1

separates the check image 247 from the background image 250. The edge 257 may be detected using any known technique(s). The image 230 may be provided in the field of view of the camera 207 prior to and during image capture of the check 108. The user 102 may adjust the camera 207, the check 5 108, and/or any light source so that the image 230 passes one or more monitoring criteria. For example, a light source from a specific angle can lead to poor light contrast. Light contrast may be a monitoring criterion, and poor light contrast may be corrected easily by moving the lens of the camera 207 to a 10 different perspective, thereby allowing the image to pass the monitoring criterion.

Feedback regarding the image 230 in the field of view with respect to the monitoring criteria may be generated and provided to the user 102. In an implementation, the feedback may 15 be provided visually, such as by text (e.g., "go closer", "go farther", "move the check to the right", "put the check on a darker background", "tilt the camera down", "take the picture now", etc.), arrows, or other visual indicators or cues (e.g., green lights, red lights, etc.) overlaid on the image 230, shown 20 as feedback indicator 235. Alternatively or additionally, feedback may be provided to the user 102 aurally, such as through a speaker associated with the mobile device 106. The feedback may advise the user 102 to move the camera 207 or the check 108 or adjust the lighting or the background, for 25 example. The feedback may also advise the user 102 when the image 230 passes the one or more monitoring criteria and to capture the image of the check 108.

One of the monitoring criteria may be based on the positioning of the check **180** in the image **230**. The positioning of the check **108** may be determined from the image **230** and compared with predetermined dimensions (e.g., of a typical personal check, of a typical business check) and tolerances. If the dimensions are within a certain acceptable tolerance, then it may be determined that the check **108** is properly positioned. Such feedback may be generated and provided to the user **102**.

In an implementation, the positioning of the check 108 in the image 230 may be compared with an alignment guide (which may or may not be visible to the user 102 in the field 40 of view of the camera 207). For example, measurements may be made by a processor in the camera 207, the mobile device 106, or a computing device at the financial institution to determine the check's position with respect to the alignment guide. The measurements may be compared to predetermined 45 measurements or values to determine whether the check's positioning in the image 230 is proper or sufficient for further processing of the image. Edge detection and/or corner detection may be used in such measurements (e.g., in measuring the distance from the check 108 in the image 230 to the 50 alignment guide). Any known technique(s) for edge detection and/or corner detection may be used. In an implementation, corner detection itself may be a monitoring criterion, such that if corner detection of the check 108 in the image 230 is achieved, then it may be concluded that the image 230 may be 55 properly processed and cleared by a depository (i.e., the image 230 passes the monitoring criteria).

The alignment guide may be overlaid on the camera feed of the mobile device 106, in an implementation. The alignment guide may take any shape such as a bounding rectangle or 60 other bounding box or shape, horizontal and/or vertical bars, parallel lines, etc., for example. With a bounding rectangle, for example, used as the alignment guide, aligning the check 108, thereby passing this monitoring criterion, means enclosing the check 108 within the bounding rectangle. If the check 65 108 is outside of the alignment guide in the image 230, feedback may be generated and provided to the user 102

8

regarding this monitoring criterion with instructions for moving the check 108 or the camera 207 in order to properly align the check 108 in the field of view.

The operator of the camera 207 may introduce distortions in the image due to a perspective problem, specifically an angling of the camera vertically over the check, and the top of the check is smaller than the bottom, or the reverse. Monitoring criteria may also be directed to determining whether the image is skewed or warped. Skewing occurs when the check 208 is rotated from the horizontal in the image 230. By measuring the distance from the edge(s) of the check 208 in the image to an alignment guide or the edge of the field of view, it may be determined whether the check 208 is skewed (e.g., by comparing the distances to one another, by comparing the distances to predetermined values, etc.). If skewing is present in the image 230, feedback may be generated and provided to the user 102 with instructions for moving the check 108 or the camera 207 in order to properly align the check 108 in the field of view with respect to the horizontal.

Warping, as used herein, is meant to denote that the check 108 is tilted forward or back with respect to a plane that is perpendicular to a line drawn from the camera lens to the center of the check 108. Warping, or tilting, of the image may lead to incorrect optical detection of the check 108. In an implementation, a processor in the camera 207, the mobile device 106, or a computing device at the financial institution may determine whether warping is present in the image, and if so, may generate and provide feedback to the user 102. Such feedback may comprise instructions to the user 102 for moving the check 108 or the camera 207 such that the check 108 would appear to be perpendicular to an imaginary line drawn from the center of the camera lens to the center of the check 108 itself (e.g., dewarping instructions).

If user involvement is tolerated, the user may be queried to supply or identify one or more corners of the check 108 in the image 230. The perimeter of the check 108 may be determined using this information. Additionally, this information may be used for monitoring the image 230 for distortions.

In an implementation, a monitoring criterion may be whether the MICR line can be detected and/or read. Any known MICR line detection technique(s) may be used by the camera 207, the mobile device 106, and/or the financial institution (e.g., using an image processor, for example) to detect the MICR line on the check 108 in the image 230. If the MICR line can be detected, it may be determined that the image 230 may be captured and sent to the financial institution for processing and clearing of the check 108 (i.e., the image passes the monitoring criterion directed to MICR line detection). If the MICR line cannot be detected, feedback may be provided to the user 102, such as to reposition the check 108 and/or the camera 207 (i.e., the image fails to pass the monitoring criterion, perhaps because the image is out focus or the lighting is inadequate, for example).

In an implementation, spacing between certain characters, points, or features (e.g., MICR number, "\$" sign, signature line, courtesy amount line, legal amount line, etc.) may be determined and used as a monitoring criterion. For example, if the MICR line can be detected, then the spacing between the numbers in the MICR line may be determined using any known measuring and/or image processing technique(s). If the spacing is outside of a certain range corresponding to valid spacing between number in a MICR line, then it may be determined that the image 230 may be not properly processed if captured by the camera 207. In such a case, feedback may be generated and provided to the user 102, such as to reposition the check 108 and/or the camera 207.

US 8,977,571 B1

Another monitoring criterion may be based on the light in the image 230, such as the light contrast and/or light brightness found on the image 230, such as in various regions of the image 230. For example, if the light contrast between the check image 247 and the background image 250 is less than a predetermined amount, then it may be determined that the image 230 may be not properly processed if captured by the camera 207. In such a case, instead of capturing the image 230, feedback may be generated and provided to the user 102 to adjust the camera 207, the check 108, and/or the lighting in order to bring the image 230 into compliance with the monitoring criteria.

As another example, the light brightness on various regions of the image may be determined and compared to each other and/or may be compared to a predetermined threshold. If the difference between the light brightness of the various regions is less than a predetermined amount (e.g., the light brightness does not vary significantly among the regions) or if the light brightness is less than a predetermined threshold, then it may be determined that the image 230 may be properly processed 20 ff captured by the camera 207. Otherwise, feedback may be generated and provided to the user 102 to adjust the camera 207, the check 108, and/or the lighting in order to change the light brightness on the image 230.

In an implementation, one or more histograms may be 25 generated based on the image 230 and used in the determination of light contrast and/or light brightness monitoring criteria. A histogram is a well known graph and may be used to display where all of the brightness levels contained in an image are found, from the darkest to the brightest. These 30 values may be provided across the bottom of the graph from left (darkest) to right (brightest). The vertical axis (the height of points on the graph) shows how much of the image is found at any particular brightness level.

Histograms may be used to monitor whether the light on 35 the image 230 is uniform, not too bright, etc. For example, the mobile device 106 can monitor the histogram of the image 230 to ensure that there is a large contrast between the background image 250 and the check image 247. Feedback may be provided to the user 102 as to how to move or adjust the camera, lighting, etc. in order to get a good image for subsequent processing (i.e., how to get an image that passes the monitoring criteria).

In an implementation, the image 230 may be divided into segments, such as those shown in FIG. 4. FIG. 4 is a diagram of the example image 230 of FIG. 3 divided into segments 260, 265, 270, 275 that may be used for monitoring the image 230. Although four segments are shown in FIG. 4, any number of segments may be used with techniques described herein. Although the segments 260, 265, 270, 275 are formed by dividing the image 250 into quadrants, the segments may be formed by any techniques, take any shape, and have any area, subject to a constraint that each segment comprises a portion of the check data 247 and a portion of the background data 250 separated by a portion of the edge 245. In this 55 manner, distinct areas of density corresponding to the background of the image and the check data of the image may be provided in a histogram.

FIG. 5 is a diagram of an example histogram 280 for a segment of an image comprising check data and background 60 data. The horizontal axis of the histogram 280 represents the grayscale level between 0 and 255, where 0 represents true black and 255 represents true white. The vertical axis represents the amount of the image at a particular grayscale level of the horizontal axis. Any known technique for generating a 65 histogram for an image (such as a grayscale image of the image 230) may be used. The histogram 280 shows two

10

distinct areas of density (i.e., two distinct density distributions). The density area 286 closer to the grayscale level of zero corresponds to the background of the image, and the density area 289 closer to the grayscale level of 255 corresponds to the check data.

The density distribution for each segment (or for the entire image 230) may be analyzed to determine whether the light contrast and/or light brightness is appropriate for processing and clearing of the check 108 in the image 230 (and thus passes that monitoring criterion) or whether the light contrast and/or light brightness does not pass the monitoring criterion and the camera 207, the check 108, and/or the light source should be adjusted or repositioned. For example, the density distributions for the segments may be compared with each other and/or may be compared to predetermined values or levels. If the differences are less than a predetermined difference amount, such as less than 1 percent different, less than 5 percent different, etc., then the image 230 may be captured and sent to the financial institution for processing. Otherwise, feedback may be generated and provided to the user 102 to reposition the camera 207, the check 108, and/or the light source.

When the image 230 passes the monitoring criteria (e.g., is positioned properly with respect to an alignment guide, is not warped, is not skewed, has adequate light brightness and/or light contrast, etc.), the image 230 may be captured either automatically (e.g., by the camera or the mobile device under direction of an application running on the camera 207 or the mobile device 106 or the financial institution) or manually (e.g., by the user 102 pressing a button or making a selection on the camera 207 or the mobile device 106). The digital image thus captured may be provided from the mobile device 106 to a financial institution. The check 108 may be deposited in a user's bank account based on the digital image. Any technique for sending the digital image to the financial institution may be used.

FIG. 6 shows a data flow diagram 300 of a system for the deposit of a check, in accordance with an example embodiment. In the data flow diagram 300, a client 320 is one example of the mobile device 106 of the user 102 described with respect to the systems 100 and 200 of FIGS. 1 and 2, respectively. In an implementation, a server 322 may be a software component operable by the depository 204 of FIG. 2. The client 320 may log in to a remote deposit system executed on the server 322. The login 325 may serve to authenticate the user 102 as an authorized consumer of the depository 204.

The server 322, in one example, may send instructions 330 to the client 320 that execute an application on the client 320. This may include instructions that cause a software object, which may have been previously downloaded and installed (e.g., pre-installed) on the client 320, to be executed on the client 320. The software object may analyze the image in the field of view of a digital camera (e.g., the image 230 shown in the field of view of the camera 207 associated with the mobile device 106) with respect to one or more monitoring criteria and may generate and provide feedback to the user regarding the monitoring criteria and/or instructions for capturing an image of the check 108.

In another example, the instructions 330 may include a wholly self-contained application that when delivered to the client 320 will execute and perform one or more operations described herein, such as those directed to analyzing the image in the field of view of the camera 207 with respect to monitoring criteria and providing feedback to the user 102. In either example, the software object may be configured to make one or more software calls 310 to the camera 207. This

Case: 23-2124 Document: 32-1 Page: 212 Filed: 03/11/2024

US 8,977,571 B1

11

may be through specific software instructions to the camera 207. In other words, the camera's functionality may not be abstracted through any software library. In such an example, software code may be written and delivered to every different camera-equipped mobile phone.

In an alternate example, the software object may operate through a software abstraction layer, such as an application programming interface (API). The software object developer may only insert code into the software object to call one or more APIs exposed by the software operating the mobile device 106. One example of such software is Windows Mobile by Microsoft Corporation. In the context of a Windows Mobile device, the Windows Mobile operating system (OS) has one or more APIs exposed to application developers that will translate instructions from applications into instructions operable by the camera 207 on the mobile device 106. A mobile operating system, also known as a mobile platform or a handheld operating system, is the operating system that controls a mobile device. Other mobiles OSs include Symbian OS, iPhone OS, Palm OS, BlackBerry OS, and Android.

The software object may cause the camera 207 to analyze an image in the field of view with respect to monitoring criteria, provide feedback, and/or take a picture or capture one or more images of the check 108 being deposited. These 25 images may be captured sequentially, e.g., pursuant to the user 102 flipping the check 108 over after an image of the front of the check 108 has been captured after passing the monitoring criteria. However, each side of the check 108 may be captured by the camera 207 using similar API calls. The images may be stored in an image file 315.

Once the images of one or both sides of the check 108 pass the monitoring criteria and are captured by the camera 207, the image file 315 may be operated on by the software object of the client 320. These operations may include any of the following: deskewing, dewarping, magnetic ink character recognition, cropping (either automatically, or having the user 102 manually identify the corners and/or edges of the check 108 for example), reducing the resolution of the image, 40 number detection, character recognition, and the like.

With respect to number and character recognition, commercial check scanners have used characteristics of the MICR encoding to detect information about the check, such as the bank's routing number and the account number. However, the characteristics that these scanners have used are the magnetic characteristic of the ink itself and these scanners have used methods similar to those of magnetic audio tape readers. In an implementation, a software object of the client 320 may optically recognize the characters on the MICR line, as a consumer mobile device such as the mobile device 106 will lack the magnetic reading ability of a commercial check scanner.

The image may be also down converted into a grayscale or black and white image, such as either in Joint Photographic Experts Group (JPEG) compliant format or in tabbed image 55 file format (TIFF) for example. In an alternate example, the image may be formatted as a Scalable Vector Graphics (SVG) image. One of the benefits of an SVG file is a large size advantage over JPEG. In the former example, the image at some point before entry into the clearing system may be converted to TIFF format. This may be performed at the mobile device 106, wherein the camera 207 captures the image in TIFF format. However, the camera 207 of the mobile device 106 may capture the image in JPEG format, which may then be converted into TIFF either at the mobile device 106 or at the server 322. In the latter example, this may use the transmission of the TIFF image across a communications

12

network which may be more advantageous as TIFF images are typically smaller in file size for the same size of picture as a JPEG formatted image.

The software object on the client 320 may operate by performing one or more of the operations described herein and then transmitting an image file 335 (e.g., based on image file 315 that has been processed) to the server 322 after the user 102 confirms that they do wish to deposit the check 108. Alternately, the software object may capture the image of the check 108 and transmit that image to the server 322 that in turn may perform those operations, verifies that the image quality is within acceptable thresholds, and communicates that verification back to the client 320, which can then instruct the user 102 to take a picture of the other side of the check 108. In this example, the image transmitted to the server 322 may be in any format, such as JPEG or TIFF, insofar as the server software has the ability to convert that image into a Check 21 compliant format. Alternately, the bank may output an X9.37 file to the clearing system. The Check Clearing for the 21st Century Act (or Check 21 Act) is a United States federal law that allows the recipient of a paper check to create a digital version, thereby eliminating the need for further handling of the physical document. The Check 21 standard for electronic exchange is defined in the standard DSTU X9.37-2003 ("X9.37"). It is a binary interchange format.

The server 322 may confirm (e.g., using a process confirmation 340) with the user 102 the transmission, reception, and processing of each side of the check 108 separately, or may confirm both sides at the same time. On the server side, more operations may be performed, such as signature verification. Where to perform these operations may be determined by the processing power of the mobile device 106 itself. which is typically limited in computational power. However, the present discussion is not limited in any way by discussion of where certain operations are described as operating. The operations of detecting and verifying information may be performed by the client 320 before the information is transmitted along with the image in the image file 335 to the server 322. Alternately, the software object(s) operating on the mobile device 106 may perform no operation other then capturing images of the front and back of the check 108 after passing the monitoring criteria, receiving confirmation that the user 102 wishes to proceed, and transmitting those images to the server 322, wherein the server 322 performs those operations.

In an implementation, after the image file 335 has been received by the server 322, the server 322 may send a process confirmation 340 to the client 320. The process confirmation 340 may request instructions from the client 320 to continue proceeding with the deposit now that the server 322 has received the image file 335. In response, the client 320 may send a deposit confirmation 345 to the server 322, instructing the server 322 to process the deposit of the check based on the image file 335 that had been received by the server 322.

FIG. 7 shows a block diagram of a client apparatus 450 and a server apparatus 570 for the deposit of a check, in accordance with an example embodiment. The client apparatus 450 may include one or more software objects operating on a mobile device 106, such as described above. The client apparatus 450 may include a communications module 452, a check processing module 454, and an image monitoring and capture module 456. The client apparatus 450 may receive, in one example, one or more check images 458 as an input and output one or more processed images 460.

In an implementation, the check images 458 may be received following a software call from the check processing module 454 to the image monitoring and capture module 456.

US 8,977,571 B1

13

In such an implementation, the image monitoring and capture module 456 may include the camera 207 contained within the mobile device 106. Alternately, the camera 207 may be detachably coupled to the mobile device 106 such as through a secure digital (SD) slot or over any suitable communications bus, such as USB (universal serial bus).

In an implementation, the image monitoring and capture module 456 may obtain an image and send the image to a financial institution (e.g., financial institution 130, the server 322, the server apparatus 570, etc.) for processing. In an implementation, the client apparatus 450 may comprise a browser such as a web browser, for accessing a website on the Internet or other network associated with a financial institution. The user may access the website and select a "monitor and capture image" link or similar icon, button or link, for example, displayed on the browser. Such a selection may call the image monitoring and capture module 456 on the client apparatus 450.

The communications module **452** may be configured, in one example, to receive and send data signals over a suitable communications network. This may include, without limitation, GSM/GPR3, HSDPA, CDMA, TDMA, 802.11, 802.16 and the like. While the bandwidth available to the mobile device **106** may be an implementation concern such discussion is outside the scope of the present discussion and any suitable wireless communications network is considered to be within the scope of the present discussion. With respect to the present discussion, the communications module **452** may receive one or more processed check images **460** from the check processing module **454** and may transmit them over the suitable communications network to the depository **204**, as described herein.

The check processing module **454** may be configured, in one example, to cause the image monitoring and capture 35 module **456** to monitor an image of at least one side of a check provided in a field of view of the camera **207** and then capture the image after it passes monitoring criteria. Compliance with the monitoring criteria is intended to ensure that the image of the check is suitable for one or more processing tasks. For 40 instance, if the check is rotated 45 degrees clockwise when captured, the check processing module **454** or a software object operated on the server **322** described above may be unable to optically detect information on the check.

The check processing module 454 may perform one or 45 more cleaning or processing operations on the captured image of the check. Such cleaning or processing may include dewarping and/or deskewing (if not part of the monitoring criteria, in an implementation), for example. Cleaning or processing may include down-converting the image received 50 from the image capture module to a suitable size, such as 200 dots per inch (DPI) resolution or in a resolution range such as 200 DPI to 400 DPI, 300 DPI to 500 DPI, etc., and/or converting the image to grayscale or black and white. Such operation(s) may reduce the file size of the check image. Alterna- 5 tively, the check processing module 454 may send instructions to the image monitoring and capture module 456 to cause the image monitoring and capture module 456 to capture an image of the check at a suitable resolution. The check processing module 454 may additionally perform any of the following operations, in further examples: convert from JPEG to TIFF, detect check information, perform signature detection on the image of the check, and the like. The check processing module 454 may, alternatively, send the captured check image to the server described herein for such process- 65 ing, and receive confirmation that the operations were completed before further operations can proceed.

14

The size of the file sent between the mobile device and the server may be small. This runs counter with respect to automatic check detection against a background. If captured in color, the contrast between check and background becomes easier. However, the processed image sent over the communications network may need to be smaller, and if the detection operation is performed by the server, it may be advantageous to convert the captured image to grayscale, or even black and white, before transmission to the server. Grayscale images are compliant with the Check 21 Act.

While "flat" is a fairly well known term to users, each user's appreciation of flat with respect to the camera lens of the camera 207 associated with the mobile device 106 may result in a problem with needing to align the check image programmatically or risk rejecting a large number of check images. As the image captured is a set of pixels, a tilted image will result in a jagged polygon rather than a perfect rectangle. Using convex hull algorithms, the check processing modules may create a smooth polygon around the boundary and remove the concavity of the check image. Alternatively, a rotating calipers algorithm may be used to determine the tightest fitting rectangle around the check boundary, which can then be used to determine the angle of it, with that angle being used to align the check properly.

The server apparatus 570 may include one or more software objects operating on a server operated by the depository 204. Aspects of an example server apparatus are described with respect to FIG. 10. The server apparatus 570 may include a communications module 572, a check processing module 574, and a check clearance module 576. The server apparatus 570 may receive one or more processed images 460 from a mobile device 106 or a client apparatus 450 as an input and may output a file such as a Check 21 compliant file 578. The Check 21 compliant file 578 may be a file or entry in a record set that is compliant with the clearinghouse rules set forth in the Check 21 Act and may include outputting an X9.37 file, in one example.

The communications module 572 may be configured to receive a wireless communication from the mobile device 106 over any suitable communications network, such as those described above. The communications module 572 may additionally receive a communication over a different communications network than the mobile device 106 communicated on, such as receiving the communication over a TCP/IP (Transmission Control Protocol/Internet Protocol) connection from the user's communication provider.

The check processing module 574 may be configured, in one example, to perform one or more check processing operations on the processed image(s) 460 that are received. In an implementation, these operations may include any of the operations described herein with respect to the check processing module 454. The operation of signature verification may be performed by the check processing module 574 of the server apparatus 570 as the server apparatus 570 may interface with other systems of the depository 204 that may maintain previously verified signature samples of the user 102. Performing signature verification at the client apparatus 450 may be computationally unfeasible; additionally, there may be a security risk if the signature sample is stored on the user's own device.

A cropped grayscale image may be sent to the server apparatus **570**. The server apparatus **570** may extract information via a TIFF conversion and determine the DPI and re-scale to the proper DPI (e.g., convert to TIFF and detect the DPI that was used in the grayscale image). In an implementation, DPI detection may run on the client apparatus **450**.

US 8,977,571 B1

15

The check clearance module 576 may be configured, in one example, to receive a file from the check processing module 574 and may communicate with a check clearinghouse such that a Check 21 compliant file may be delivered to the check clearinghouse and funds may be received by the depository 204. The availability of the funds to the user 102 may be delayed by this operation such that the user 102 only has access to those funds when the depository 204 receives confirmation that the check has cleared.

FIG. **8** is an operational flow of an implementation of a 10 method **800** that may be used for deposit of a check using image monitoring of the check. At **810**, a request for access may be received from a user (e.g., the user **102**). The user may request access to a deposit system operated by a depository (e.g., the depository **204**) by way of a mobile device (e.g., the mobile device **106**) such as a cellular phone, a PDA, a handheld computing device, etc. operated by the user. The access may be through some sort of user login, in some examples. The deposit system may be configured to receive a deposit of a negotiable instrument, such as a check, money order, cashier's check, etc. from the user and clear the negotiable instrument in a suitable clearinghouse system.

At **820**, the system may initialize a software object on the mobile device. This may include sending instructions to the mobile device intended to execute a previously installed (i.e., 25 pre-installed) software object. Alternatively, the system may send a software object to the mobile device that may execute the software object, carry out operations described herein by use of the software object, and terminate the software object. In an implementation, the system may instruct a camera associated with the mobile device to monitor and capture an image of the negotiable instrument in conjunction with monitoring criteria.

The user may use the camera to obtain an image in the field of view of the camera, and at 830, the image in the field of 35 view of the camera may be monitored with respect to one or more monitoring criteria, such as those described above. The monitoring may be performed by the camera, the mobile device, and/or a computing device associated with the depository, for example. The monitoring may be performed pursu- 40 ant to instructions received at the camera or mobile device from the deposit system operated by a depository, the server 322, or the server apparatus 570, for example. In an implementation, the results of the monitoring may indicate that the camera and/or the check should be repositioned and/or the 45 light source should be adjusted prior to an image capture in order to capture an image of the check that may be processed properly, e.g., to have the data from the check obtained without error from the image, so that that check can be cleared.

At **840**, feedback based on the results may be generated and provided visually and/or aurally to the user via the camera and/or the mobile device. In an implementation, the feedback may be provided if the image fails to pass the monitoring criteria. The feedback may comprise instructions or guidance for the user to follow to obtain an image of the check in the field of view of the camera that will pass the monitoring criteria. Processing may continue at **830** with the image that is currently in the field of view of the camera (after the user has received and acted on the feedback) being monitored with respect to the monitoring criteria.

When the image in the field of view passes the monitoring criteria as determined at 830, the image in the field of view may be captured by the camera at 850. This may be accomplished through the software object accessing a camera associated with the mobile device (e.g., either comprised within 65 the mobile device or separate from the mobile device). This may be done through an API exposed by the OS of the mobile

16

device, or may be through software code customized for a specific phone and specific camera. With respect to the former, a developer of the software object may write code to the camera API(s), which may be specific to the OS and without regard to the camera on the device. The user may initiate the capture of the image (e.g., by pressing a button on the camera or the mobile device) or the image may be captured automatically, without user intervention, as soon as the image in the field of view is determined to have passed the monitoring criteria. In this manner, the occurrence of non-conforming images downstream (e.g., at a depository or financial institution) is reduced, and there is a high confidence that the image will be properly processed downstream.

In an implementation, when the image in the field of view is determined to pass the monitoring criteria, feedback may be generated and provided to the user indicating so. The feedback may instruct the user to capture the image now (e.g., by pressing a button on the camera or mobile device) or may advise the user that the image has been captured, for example.

At **860**, the captured image may be transmitted to the depository, e.g. as a digital image file. At **870**, the depository may receive the image of the check (along with financial information pertaining to the account for depositing funds, for example) and may process the image. Processing of the digital image file may include retrieving financial information regarding the check. The financial information may comprise the MICR number, the routing number, an amount, etc. Any known image processing technology may be used, such as edge detection, filtering to remove imagery except the check image or check data in the received digital image file, image sharpening, and technologies to distinguish between the front and the back sides of the check. The depository may identify and/or remove at least a portion of data that is extraneous to the check, such as background data.

After retrieving the financial information from the check in an electronic data representation form, the depository may determine whether the financial information such as the amount payable to the user, the account associated with the user to deposit funds, an account associated with a payor to debit funds, and an institution associated with the payor, etc., may be valid. For example, the depository may include electronic devices such as computers, servers, databases, or the like that may be in communication with each other. The electronic devices may receive an electronic data representation and may perform an analysis on the quality of the data representation, the readability of the data representation, or the like. For example, the electronic devices may determine whether the account number, amount payable, or the like may be readable such that they may be parsed and processed by the depository to credit an account associated with the user.

If the financial information is determined to be valid, the electronic data representation may be processed by the depository, thereby depositing the money in the user's account. If the financial information is determined to be invalid, then the user may be advised. For example, the depository may transmit an email, a web message, an instant message, or the like to the user indicating that the financial information associated with the electronic data representation may be invalid. The user may determine how to proceed by selecting an option on the web message, replying to the email, or the like.

Thus, in an implementation, instructions on how the user would like to proceed may be requested from the user, such as whether the user would like to try the deposit again (e.g., make another image of the check that pass the monitoring criteria and send it to the depository) or whether the user would like assistance from a representative, for example. The

US 8,977,571 B1

17

user may indicate how they would like to proceed. If the user would like assistance, the financial information may be transferred to a representative for further review. The representative may review the financial information associated with the electronic data representation to determine whether to allow 5 the electronic data representation to be processed by the depository. If so, the electronic data representation of the financial information may be processed by the depository, thereby depositing the check in the user's account. The depository may send a notice to the user via email, facsimile, 10 instant message, or mail, for example, that the check has been deposited into the selected account.

FIG. 9 is an operational flow of another implementation of a method 900 that may be used for deposit of a check using image monitoring of the check. A user (e.g., the user 102) may 15 receive and endorse a check (e.g., the check 108) at 910, and open a communication pathway with an institution (e.g., the financial institution 130) at 920. In an implementation, the user may open a communication pathway with the institution by logging into a website of the institution, for example. There may be several ways in which a communication pathway may be established, including, but not limited to, an Internet connection via a website of the institution. The user may access the website and log into the website using credentials, such as, but not limited to, a username and a pass- 25 word.

At 930, the user may send a request to deposit the check and may select an account in which to deposit the check. In an implementation, the user may select a "deposit check" option provided on the website, and may enter details such as check amount, date, the account the check funds should be deposited in, comments, etc.

At 940, an image in the field of view of the camera may be obtained and provided, via the communication pathway, to the institution. A still image may be provided or a video may be provided, such as a video stream generated by the camera.

At 950, the institution may receive the image or video stream and may analyze the image or a frame of the video stream with respect to one or more monitoring criteria, such as those described above. Feedback pertaining to the image 40 with respect to the monitoring criteria may be generated and provided to the user over the communication pathway. Based on the feedback, the user may adjust the position the camera and/or the check and/or may adjust the light source until the image in the field of view of the camera is determined by the 45 institution to pass the monitoring criteria.

When the image in the field of view passes the monitoring criteria, the image in the field of view may be captured (e.g., automatically without user intervention or pursuant to the user pressing a button) by the camera at 960, thereby creating 50 a digital image of the check. In an implementation, the user may instruct the camera (e.g., by pressing a button on the camera or the mobile device) to create the digital image. In another implementation, the camera may automatically create the digital image as soon as the image of the check passes 55 the monitoring criteria. In this manner, the user may point the camera at the check such that the image of the check appears in the field of view, and after image has been determined to pass the monitoring criteria, a digital image of the check may be created without further user intervention. Depending on 60 the implementation, one or more digital images of the check (e.g., corresponding to the front and back of the check) may be created using such techniques.

At 970, the digital image(s) may be uploaded to the institution using any known image upload process. In an imple-65 mentation, the upload may be augmented by secondary data which may be information relating to the deposit of the check,

18

such as an account number and a deposit amount, for example. At **980**, when the institution has received the digital images (e.g., of the front and back sides of the check), the institution may process the digital images to obtain an image of the check and to deposit the funds of the check in the user's account, as described herein. It is contemplated that processing such as grayscale conversion, image cropping, image compression, edge and/or corner detection, etc. may be implemented in the method **900**. Such operations may be performed on one or more digital images created by the camera and may be performed on the image(s) by the mobile device and/or by the institution, as described further above.

Although the examples described herein may refer to uploading of images of checks to an institution, it is contemplated that any negotiable instrument or image (e.g., vehicle accident pictures provided to an insurance company) may be processed and/or transmitted using the techniques described herein. Additionally, one or more of the techniques described herein may be performed by the institution instead of the mobile device of the user.

FIG. 10 is a block diagram of an example computing environment in which example embodiments and aspects may be implemented. The computing system environment is only one example of a suitable computing environment and is not intended to suggest any limitation as to the scope of use or functionality. Numerous other general purpose or special purpose computing system environments or configurations may be used. Examples of well known computing systems, environments, and/or configurations that may be suitable for use include, but are not limited to, personal computers (PCs), server computers, handheld or laptop devices, multiprocessor systems, microprocessor-based systems, network PCs, minicomputers, mainframe computers, embedded systems, distributed computing environments that include any of the above systems or devices, and the like.

Computer-executable instructions, such as program modules, being executed by a computer may be used. Generally, program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Distributed computing environments may be used where tasks are performed by remote processing devices that are linked through a communications network or other data transmission medium. In a distributed computing environment, program modules and other data may be located in both local and remote computer storage media including memory storage devices.

With reference to FIG. 10, a system 1000 includes a computer 1010 connected to a network 1014. The computer 1010 includes a processor 1020, a storage device 1022, an output device 1024, an input device 1026, and a network interface device 1028, all connected via a bus 1030. The processor 1020 represents a central processing unit of any type of architecture, such as a CISC (Complex Instruction Set Computing), RISC (Reduced Instruction Set Computing), VLIW (Very Long Instruction Word), or a hybrid architecture, although any appropriate processor may be used. The processor 1020 executes instructions and includes that portion of the computer 1010 that controls the operation of the entire computer. Although not depicted in FIG. 10, the processor 1020 typically includes a control unit that organizes data and program storage in memory and transfers data and other information between the various parts of the computer 1010. The processor 1020 receives input data from the input device 1026 and the network 1014 reads and stores code and data in the storage device 1022 and presents data to the output device 1024. Although the computer 1010 is shown to contain only a single processor 1020 and a single bus 1030, the disclosed

US 8,977,571 B1

19

embodiment applies equally to computers that may have multiple processors and to computers that may have multiple busses with some or all performing different functions in different ways.

The storage device 1022 represents one or more mechanisms for storing data. For example, the storage device 1022 may include read-only memory (ROM), RAM, magnetic disk storage media, optical storage media, flash memory devices, and/or other machine-readable media. In other embodiments, any appropriate type of storage device may be used. Although only one storage device 1022 is shown, multiple storage devices and multiple types of storage devices may be present. Further, although the computer 1010 is drawn to contain the storage device 1022, it may be distributed across other computers, for example on a server.

The storage device 1022 includes a controller (not shown in FIG. 10) and data items 1034. The controller includes instructions capable of being executed on the processor 1020 to carry out functions previously described herein with reference to FIGS. 1-9. In another embodiment, some or all of the 20 functions are carried out via hardware in lieu of a processorbased system. In one embodiment, the controller is a web browser, but in other embodiments the controller may be a database system, a file system, an electronic mail system, a media manager, an image manager, or may include any other 25 functions capable of accessing data items. The storage device 1022 may also contain additional software and data (not shown), which is not necessary to understand the invention. Although the controller and the data items 1034 are shown to be within the storage device 1022 in the computer 1010, some 3 or all of them may be distributed across other systems, for example on a server and accessed via the network 1014.

The output device 1024 is that part of the computer 1010 that displays output to the user. The output device 1024 may be a liquid crystal display (LCD) well-known in the art of 35 computer hardware. In other embodiments, the output device 1024 may be replaced with a gas or plasma-based flat-panel display or a traditional cathode-ray tube (CRT) display. In still other embodiments, any appropriate display device may be used. Although only one output device 1024 is shown, in 40 other embodiments any number of output devices of different types, or of the same type, may be present. In an embodiment, the output device 1024 displays a user interface. The input device 1026 may be a keyboard, mouse or other pointing device, trackball, touchpad, touch screen, keypad, micro- 45 phone, voice recognition device, or any other appropriate mechanism for the user to input data to the computer 1010 and manipulate the user interface previously discussed. Although only one input device 1026 is shown, in another embodiment any number and type of input devices may be present.

The network interface device 1028 provides connectivity from the computer 1010 to the network 1014 through any suitable communications protocol. The network interface device 1028 sends and receives data items from the network 1014. The bus 1030 may represent one or more busses, e.g., 55 USB, PCI, ISA (Industry Standard Architecture), X-Bus, EISA (Extended Industry Standard Architecture), or any other appropriate bus and/or bridge (also called a bus controller).

The computer 1010 may be implemented using any suitable hardware and/or software, such as a personal computer or other electronic computing device. Portable computers, laptop or notebook computers, PDAs, pocket computers, appliances, telephones, and mainframe computers are examples of other possible configurations of the computer 65 1010. For example, other peripheral devices such as audio adapters or chip programming devices, such as EPROM

20

(Erasable Programmable Read-Only Memory) programming devices may be used in addition to, or in place of, the hardware already depicted.

The network 1014 may be any suitable network and may support any appropriate protocol suitable for communication to the computer 1010. In an embodiment, the network 1014 may support wireless communications. In another embodiment, the network 1014 may support hard-wired communications, such as a telephone line or cable. In another embodiment, the network 1014 may support the Ethernet IEEE (Institute of Electrical and Electronics Engineers) 802.3x specification. In another embodiment, the network 1014 may be the Internet and may support IP (Internet Protocol). In another embodiment, the network 1014 may be a LAN or a WAN. In another embodiment, the network 1014 may be a hotspot service provider network. In another embodiment, the network 1014 may be an intranet. In another embodiment, the network 1014 may be a GPRS (General Packet Radio Service) network. In another embodiment, the network 1014 may be any appropriate cellular data network or cell-based radio network technology. In another embodiment, the network 1014 may be an IEEE 802.11 wireless network. In still another embodiment, the network 1014 may be any suitable network or combination of networks. Although one network 1014 is shown, in other embodiments any number of networks (of the same or different types) may be present.

It should be understood that the various techniques described herein may be implemented in connection with hardware or software or, where appropriate, with a combination of both. Thus, the methods and apparatus of the presently disclosed subject matter, or certain aspects or portions thereof, may take the form of program code (i.e., instructions) embodied in tangible media, such as floppy diskettes, CD-ROMs, hard drives, or any other machine-readable storage medium wherein, when the program code is loaded into and executed by a machine, such as a computer, the machine becomes an apparatus for practicing the presently disclosed subject matter. In the case of program code execution on programmable computers, the computing device generally includes a processor, a storage medium readable by the processor (including volatile and non-volatile memory and/or storage elements), at least one input device, and at least one output device. One or more programs may implement or use the processes described in connection with the presently disclosed subject matter, e.g., through the use of an API, reusable controls, or the like. Such programs may be implemented in a high level procedural or object-oriented programming language to communicate with a computer system. However, the program(s) can be implemented in assembly or machine lan-50 guage, if desired. In any case, the language may be a compiled or interpreted language and it may be combined with hardware implementations.

Although exemplary embodiments may refer to using aspects of the presently disclosed subject matter in the context of one or more stand-alone computer systems, the subject matter is not so limited, but rather may be implemented in connection with any computing environment, such as a network or distributed computing environment. Still further, aspects of the presently disclosed subject matter may be implemented in or across a plurality of processing chips or devices, and storage may similarly be effected across a plurality of devices. Such devices might include personal computers, network servers, and handheld devices, for example. Although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the specific

US 8,977,571 B1

2

features or acts described above. Rather, the specific features and acts described above are disclosed as example forms of implementing the claims.

What is claimed:

1. A non-transitory computer-readable medium comprising computer-readable instructions for depositing a check that, when executed by a processor, cause the processor to:

monitor an image of the check in a field of view of a camera of a mobile device with respect to a monitoring criterion using an image monitoring and capture module of the mobile device:

capture the image of the check with the camera when the image of the check passes the monitoring criterion; and provide the image of the check from the camera to a depository via a communication pathway between the mobile device and the depository.

- 2. The non-transitory computer-readable medium of claim 1, further comprising instructions that provide feedback, via the mobile device to a user of the mobile device, regarding the image of the check with respect to the monitoring criterion prior to capturing the image of the check.
- 3. The non-transitory computer-readable medium of claim 2, wherein the feedback is provided if the image fails to pass the monitoring criterion.
- **4.** The non-transitory computer-readable medium of claim **3**, wherein the feedback comprises instructions for the user to follow to obtain a second image of the check in the field of view of the camera that passes the monitoring criterion.
- 5. The non-transitory computer-readable medium of claim 30 4, wherein the feedback is provided visually in the field of view of the camera.
- **6.** The non-transitory computer-readable medium of claim **1**, wherein capturing the image of the check is performed automatically without user intervention when the image of 35 the check passes the monitoring criterion.
- 7. The non-transitory computer-readable medium of claim 1, where the computer-readable instructions cause the processor to monitor the image of the check in the field of view of the camera with respect to a monitoring criterion without providing feedback, via the mobile device, regarding the monitoring of the image of the check in the field of view of the camera.
- 8. The non-transitory computer-readable medium of claim 1, where the computer-readable instructions cause the processor to monitor the image of the check in the field of view of the camera with respect to a monitoring criterion without providing feedback, via the mobile device, regarding the monitoring of the image of the check in the field of view of the camera.
- **9.** A non-transitory computer-readable medium comprising computer-readable instructions for depositing a check that, when executed by a processor, cause the processor to:
 - initialize a software object on a mobile device operated by a user, the software object configured to communicate with a camera;
 - monitor an image of the check in a field of view of the camera with respect to a monitoring criterion using an image monitoring and capture module associated with the camera;

22

capture the image of the check using the camera when the image of the check in the field of view passes the monitoring criterion; and

transmit the image of the check from the mobile device to a deposit system configured to clear the check and deposit funds of the check into a deposit account of the user.

- 10. The non-transitory computer-readable medium of claim 9, further comprising instructions that provide feedback, via the mobile device to the user, when the image of the check in the field of view passes the monitoring criterion, prior to capturing the image of the check.
- 11. The non-transitory computer-readable medium of claim 10, wherein the feedback comprises instructions to the user to capture the image of the check.
- 12. The non-transitory computer-readable medium of claim 9, wherein the monitoring criterion comprises light contrast or light brightness of the image.
- 13. The non-transitory computer-readable medium of claim 9, wherein the monitoring criterion comprises skewing of the image or warping of the image.
 - 14. A system for depositing a check, comprising:
 - a subsystem that receives at a server a request for access to a deposit system from a mobile device;
 - a subsystem that receives, at the server from the mobile device, an image of the check in a field of view of a camera associated with the mobile device;
 - a subsystem that monitors, at a computing device of the server, the image with respect to a monitoring criterion;
 - a subsystem that provides instructions from the server to the mobile device to create a digital image of the check when the image passes the monitoring criterion;
 - a subsystem that receives the digital image at the server from the mobile device;
 - a subsystem that processes the digital image at a check processing module of the server; and
 - a subsystem that deposits funds of the check into an account associated with the deposit system using the processed digital image and a check clearance module of the server.
- 15. The system of claim 14, wherein the monitoring criterion is based on light in the image.
- 16. The system of claim 15, wherein the subsystem that monitors the image with respect to the monitoring criterion comprises a subsystem that generates a histogram using the image and uses the histogram in determining when the image passes the monitoring criterion.
- 17. The system of claim 14, further comprising a subsystem that provides feedback from the server to the mobile device regarding the image with respect to the monitoring criterion prior to the image passing the monitoring criterion.
- **18**. The system of claim **14**, wherein creating the digital image of the check when the image passes the monitoring criterion is performed without user intervention.
- 19. The system of claim 14, wherein the mobile device comprises a video source and the image of the check is provided in a video received from the mobile device.
- 20. The system of claim 14, wherein the image of the check is a frame of a live video of the check.

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(12) United States Patent Prasad et al.

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(54) SYSTEMS AND METHODS FOR ALIGNMENT OF CHECK DURING MOBILE DEPOSIT

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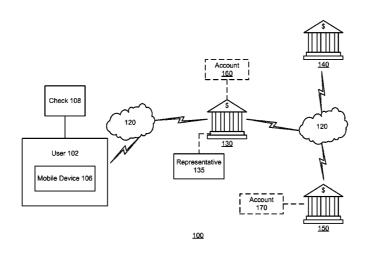
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(57) ABSTRACT

An alignment guide may be provided in the field of view of a camera associated with a mobile device used to capture an image of a check. When the image of the check is within the alignment guide in the field of view, an image may be taken by the camera and provided from the mobile device to a financial institution. The alignment guide may be adjustable at the mobile device. The image capture may be performed automatically by the camera or the mobile device as soon as the image of the check is determined to be within the alignment guide. The check may be deposited in a user's bank account based on the image. Any technique for sending the image to the financial institution may be used.

23 Claims, 9 Drawing Sheets



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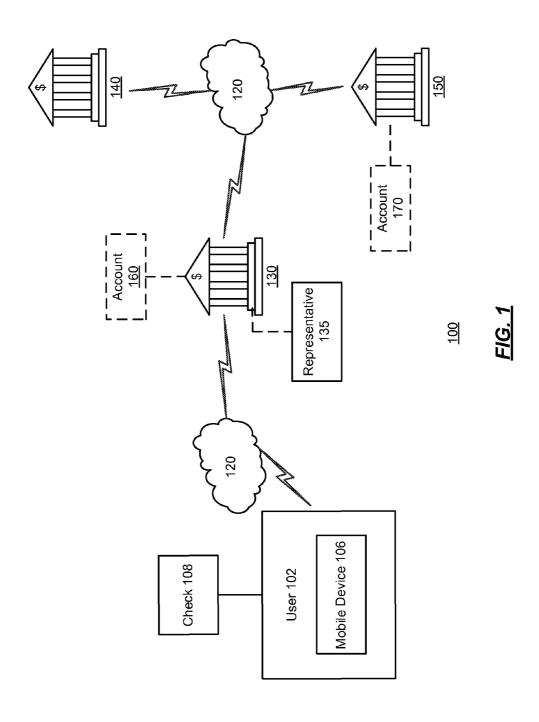
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U.S. Patent Apr. 15, 2014 Sheet 1 of 9 US 8,699,779 B1



U.S. Patent Apr. 15, 2014 Sheet 2 of 9 US 8,699,779 B1

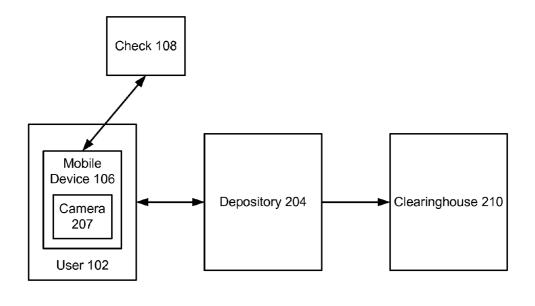
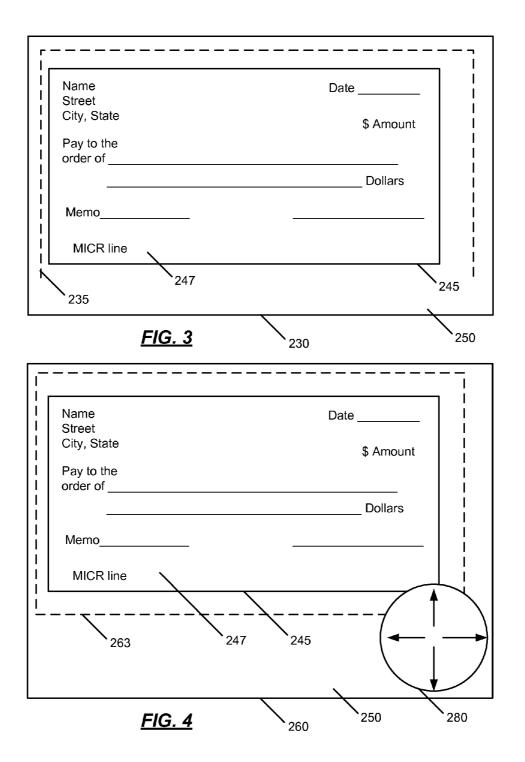


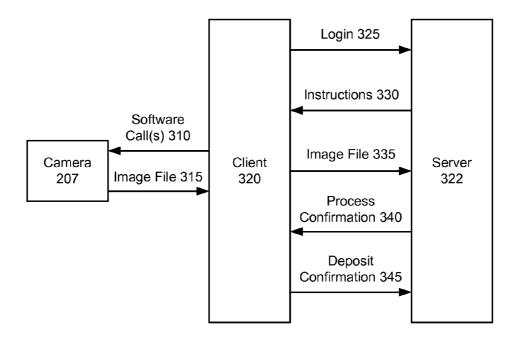
FIG. 2

<u>200</u>

U.S. Patent Apr. 15, 2014 Sheet 3 of 9 US 8,699,779 B1



U.S. Patent Apr. 15, 2014 Sheet 4 of 9 US 8,699,779 B1



<u>300</u>

FIG. 5

U.S. Patent Apr. 15, 2014 Sheet 5 of 9 US 8,699,779 B1

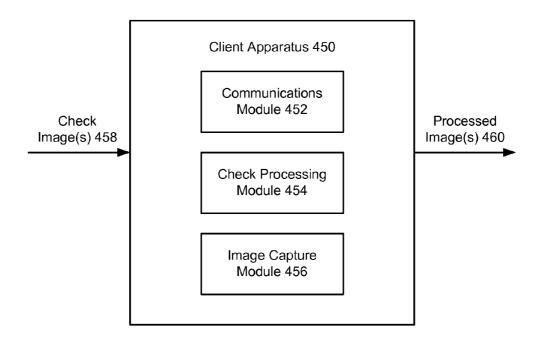


FIG. 6

U.S. Patent Apr. 15, 2014 Sheet 6 of 9 US 8,699,779 B1

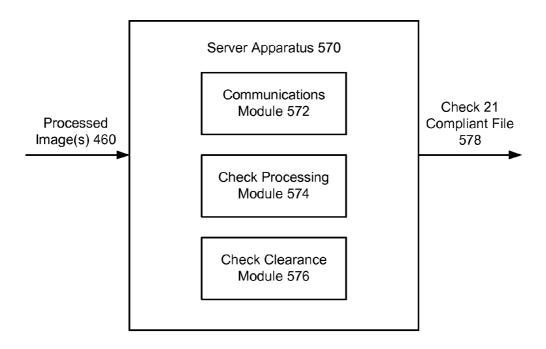
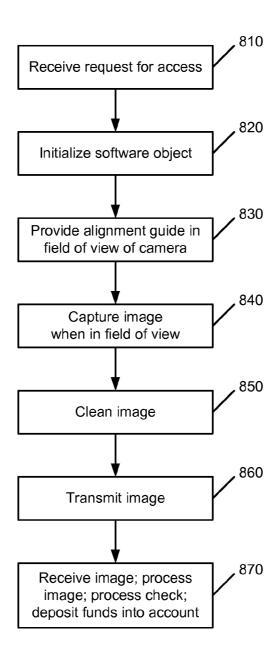


FIG. 7

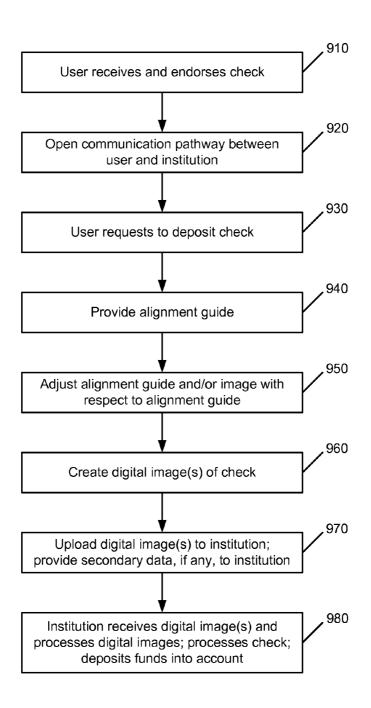
U.S. Patent Apr. 15, 2014 Sheet 7 of 9 US 8,699,779 B1



<u>800</u>

FIG. 8

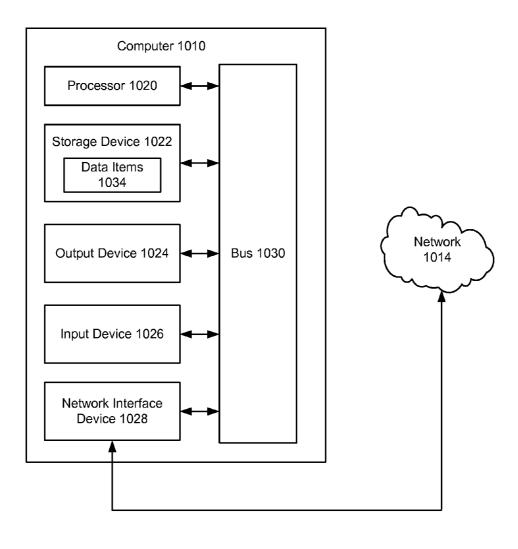
U.S. Patent Apr. 15, 2014 Sheet 8 of 9 US 8,699,779 B1



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FIG. 9

U.S. Patent Apr. 15, 2014 Sheet 9 of 9 US 8,699,779 B1



<u>1000</u>

FIG. 10

US 8,699,779 B1

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SYSTEMS AND METHODS FOR ALIGNMENT OF CHECK DURING MOBILE DEPOSIT

BACKGROUND

Checks typically provide a safe and convenient method for an individual such as a payor to transfer funds to a payee. To use a check, the individual usually opens a checking account, or other similar account, at a financial institution and deposits funds, which are then available for later withdrawal. To transfer funds with a check, the payor usually designates a payee and an amount payable on the check. In addition, the payor often signs the check. Once the check has been signed, it is usually deemed negotiable, meaning the check may be validly transferred to the payee upon delivery. By signing and transferring the check to the payee, the payor authorizes funds to be withdrawn from the payor's account on behalf of the payee.

While a check may provide a payor with a convenient and secure form of payment, receiving a check may put certain ²⁰ burdens on the payee, such as the time and effort required to deposit the check. For example, depositing a check typically involves going to a local bank branch and physically presenting the check to a bank teller. To reduce such burdens for the payee, systems and methods have been developed to enable ²⁵ the remote deposit of checks.

For example, the payee may capture a digital image of a check using a mobile device. The financial institution may then receive from the payee the digital image of the check. The financial institution may then use the digital image to credit funds to the payee. However, such a technique requires the efficient and accurate detection and extraction of the information pertaining to a check in the digital image. Capturing a digital image at a mobile device that allows for detection and extraction of the information from the digital image is diffiable.

SUMMARY

An alignment guide may be provided in the field of view of 40 a camera associated with a mobile device used to capture an image of a check. When the image of the check is within the alignment guide in the field of view, an image may be taken by the camera and provided from the mobile device to a financial institution. The check may be deposited in a user's bank 45 account based on the image. Any technique for sending the image to the financial institution may be used.

In an implementation, the alignment guide may be adjustable at the mobile device. The adjustment may be made by the user, the financial institution, the camera, and/or the mobile device. In an implementation, an image may be captured when the image of the check is detected to be within the alignment guide. The image capture may be performed automatically by the camera or the mobile device as soon as the image of the check is determined to be within the alignment guide.

This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing summary, as well as the following detailed description of illustrative embodiments, is better understood

2

when read in conjunction with the appended drawings. For the purpose of illustrating the embodiments, there are shown in the drawings example constructions of the embodiments; however, the embodiments are not limited to the specific methods and instrumentalities disclosed. In the drawings:

FIG. 1 is a block diagram of an implementation of a system in which example embodiments and aspects may be implemented:

FIG. 2 shows a high-level block diagram of an implementation of a system that may be used for the deposit of a check;

FIG. 3 is a diagram of an example image comprising a check image, a background image, and an alignment guide;

FIG. 4 is a diagram of another example image comprising a check image, a background image, and an alignment guide;

FIG. 5 shows a data flow diagram of a system for the deposit of a check, in accordance with an example embodiment:

FIG. 6 shows a block diagram of a client apparatus for the deposit of a check, in accordance with an example embodiment;

FIG. 7 shows a block diagram of a server apparatus for the deposit of a check, in accordance with an example embodiment;

FIG. **8** is an operational flow of an implementation of a method that may be used for deposit of a check using alignment of the check:

FIG. 9 is an operational flow of another implementation of a method that may be used for deposit of a check using alignment of the check; and

FIG. 10 is a block diagram of an example computing environment in which example embodiments and aspects may be implemented.

DETAILED DESCRIPTION

In the following detailed description of example embodiments, reference is made to the accompanying drawings, which form a part hereof and in which is shown, by way of illustration, specific embodiments in which the example methods, apparatuses, and systems may be practiced. It is to be understood that other embodiments may be used and structural changes may be made without departing from the scope of this description.

FIG. 1 is a block diagram of an implementation of a system 100 in which example embodiments and aspects may be implemented. System 100 may include an account owner, referred to herein as a user 102, and financial institutions 130, 140, and 150, which may be any type of entity capable of processing a transaction involving a negotiable instrument. For example, financial institutions 130, 140, and 150 may be a retail bank, an investment bank, an investment company, a regional branch of the Federal Reserve, a clearinghouse bank and/or a correspondent bank.

A negotiable instrument typically includes a type of contract that obligates one party to pay a specified sum of money to another party. Negotiable instrument as used herein is an unconditioned writing that promises or orders payment of a fixed amount of money. One example of a negotiable instrument is a check. The check may be taken by the receiving party and deposited into an account at a financial institution of the receiving party. The receiving party may endorse the check and then present it for deposit at a bank branch, via an automated teller machine (ATM), or by using remote deposit. Other examples of negotiable instruments include money orders, cashier's checks, drafts, bills of exchange, promissory notes, and the like. A money order is a trusted financial instrument that is a payment order for a pre-specified amount

US 8,699,779 B1

of money. A cashier's check (also known as a bank check, official check, teller's check, bank draft or treasurer's check) is a check guaranteed by a bank and may be purchased from a bank

The user 102 may be an individual or entity who owns 5 account 160 that may be held at financial institution 130. Account 160 may be any type of deposit account for depositing funds, such as a savings account, a checking account, a brokerage account, and the like. The user 102 may deposit a check 108 or other negotiable instrument in the account 160 either electronically or physically. The financial institution 130 may process and/or clear the check 108 or other negotiable instrument. The user 102 may communicate with financial institution 130 by way of communications network 120 such as an intranet, the Internet, a local area network (LAN), 15 a wide area network (WAN), a wireless fidelity (WiFi) network, a public switched telephone network (PSTN), a cellular network, a voice over Internet protocol (VoIP) network, and the like. The user 102 may communicate with financial institution 130 by phone, email, instant messaging, text messag- 20 ing, web chat, facsimile, mail, and the like. Financial institutions 130, 140, and 150 also may communicate with each other by way of communications network 120.

In an implementation, the user 102 may receive payment from another individual such as a payor in the form of a check 25 108 or other negotiable instrument that is drawn from account 170 at financial institution 150. The user 102 may endorse the check 108 (e.g., sign the back of the check 108) and indicate an account number on the check 108 for depositing the funds. It is noted that although examples described herein may refer to a check, the techniques and systems described herein are contemplated for, and may be used for, deposit of any negotiable instrument. Similarly, the techniques and systems described herein are contemplated for and may be used with any form or document whose image may be captured with a camera or other imaging device of a mobile device for subsequent storage and/or processing.

As described further herein, a digital image of a check or other negotiable instrument may be provided from a user to a financial institution, and the digital image may be processed 40 and funds associated with the check or negotiable instrument in the digital image may be deposited in a user's bank account. The user 102 may deposit the check 108 into account 160 by making a digital image of the check 108 and sending the image file containing the digital image to financial insti- 45 tution 130. For example, after endorsing the check 108, the user 102 may use a mobile device 106 that comprises a camera to convert the check 108 into a digital image by taking a picture of the front and/or back of the check 108. The mobile device 106 may be a mobile phone (also known as a wireless 50 phone or a cellular phone), a personal digital assistant (PDA), or any handheld computing device, for example. Aspects of an example mobile device are described with respect to FIG.

To increase the likelihood of capturing a digital image of 55 the check 108 that may be readable and processed such that the check 108 can be cleared, an alignment guide may be provided in the field of view of the camera of the mobile device 106. The field of view is that part of the world that is visible through the camera at a particular position and orientation in space; objects outside the field of view when the image is captured are not recorded in the image. The user may move the camera or the check 108 until the check 108 is viewed within the alignment guide in the field of view of the camera. The digital image of the check 108 may then be 65 captured. The alignment guide may provide a pre-image capture quality check that helps reduce the number of non-com-

4

forming images of checks during presentment of the images to a financial institution for processing and clearing.

In an implementation, the image capture may be performed automatically by the camera or the mobile device 106 as soon as the image of the check is determined to be within the alignment guide. Alternatively, the user 102 may manually instruct the camera to perform the image capture (e.g., by pressing a button the camera or the mobile device 106). Examples of alignment guides are described further with respect to FIGS. 3 and 4, for example.

In an implementation, the user 102 may send the digital image(s) to financial institution 130 using the mobile device 106. Any technique for sending a digital image to financial institution 130 may be used, such as providing a digital image to a website associated with financial institution 130 from storage, emailing a digital image to financial institution 130, or sending a digital image in a text message or instant message, for example.

Financial institution 130 may receive a digital image representing the check 108 and may use any known image processing software or other application(s) to obtain the relevant data of the check 108 from the digital image. Financial institution 130 may determine whether the financial information associated therewith may be valid. For example, financial institution 130 may include any combination of systems and subsystems such as electronic devices including, but not limited to, computers, servers, databases, or the like. The electronic devices may include any combination of hardware components such as processors, databases, storage drives, registers, cache, random access memory (RAM) chips, data buses, or the like and/or software components such as operating systems, database management applications, or the like. According to an embodiment, the electronic devices may include a network-based server that may process the financial information and may receive the digital image from the user 102

The electronic devices may receive the digital image and may perform an initial analysis on the quality of the digital image, the readability of the data contained therein, or the like. For example, the electronic devices may determine whether the account number, amount payable, and the like may be readable such that it may be parsed or otherwise obtained and processed by the financial institution to credit an account 160 associated with the user 102 and debit an account associated with the payor. In an implementation, a representative 135 of financial institution 130 may provide assistance to the user 102 and may provide assistance in determining whether the financial information may be readable and/or of a good enough quality to be processed, as described further herein.

Upon receipt and approval of the digital image, financial institution 130 may credit the funds to account 160. Financial institution 130 may clear the check 108 by presenting a digital image of the check 108 captured from the digital image to an intermediary bank, such as a regional branch of the Federal Reserve, a correspondent bank, and/or a clearinghouse bank. For example, the check 108 may be cleared by presenting the digital image to financial institution 140, which may be a regional branch of the Federal Reserve, along with a request for payment. Financial institutions 130 and 150 may have accounts at the regional branch of the Federal Reserve. Financial institution 130 may create a substitute check using the image provided by the user 102 and present the substitute check to financial institution 140 for further processing. Upon receiving the substitute check, financial institution 140 may identify financial institution 150 as the paying bank (e.g., the bank from which the check 108 is drawn). This may be

US 8,699,779 B1

accomplished using a nine digit routing number located on the bottom left hand corner of the check. A unique routing number is typically assigned to every financial institution in the United States. Financial institution 140 may present the substitute check to financial institution 150 and request that the check be paid. If financial institution 150 verifies the check (i.e., agrees to honor the check), financial institution 140 may then settle the check by debiting funds from financial institution 150 and crediting funds to financial institution 130. Financial institution 150 may then debit funds from 10 account 170.

It will be appreciated that the preceding examples are for purposes of illustration and explanation only, and that an embodiment is not limited to such examples. For example, financial institution 150 may be a correspondent bank (i.e., 15 engaged in a partnership with financial institution 130). Thus, financial institution 130 may bypass the regional branch of the Federal Reserve and clear the check directly with financial institution 150. In addition, account 160 and account 170 may both be held at financial institution 130, in which case the 20 check 108 may be cleared internally.

FIG. 2 shows a high-level block diagram of an implementation of a system 200 that may be used for the deposit of a check, such as the check 108. As described further herein, the user 102 may deposit the funds of the check 108 using the 25 camera functionality in the mobile device 106. In the example of one person giving a check to another person, this would enable the receiving party to deposit the funds at that time, without physically visiting an ATM or a bank branch.

In an implementation, the mobile device 106 may comprise 30 a camera 207, such as a digital camera. Such a mobile device may be called a camera phone. The mobile device 106, through the camera 207, has the ability to take or capture a picture or digital image of the check 108 or other negotiable instrument. The camera 207 may take an image of the front of 35 the check 108. Alternatively, the camera 207 may take an image of both the front and the back of the check 108. The back of the check may provide endorsement verification, such as the signature of the person or party the check is made out to. In an implementation, an alignment guide may be provided 40 within the field of view of the camera 207, e.g., using a software application running on the mobile device 106. The alignment guide may be provided during image capture to assist the user 102 in positioning the check 108 so that the image of the check 108 may be captured in such a manner that 45 it may be more easily processed and cleared during subsequent operations, such as those involving one or more financial institutions

A depository 204 may include a bank in which the user 102 has a deposit account; however, the present disclosure is not 50 limited to just banks. Alternatively, a third party may act as the depository 204 providing functionality to a plurality of users without regard to the bank at which they have deposit accounts, or whether their individual bank allows for the methods and systems described herein. The depository 204, in an implementation, after receiving the image(s) of the check 108 from the user 102, may use a clearinghouse 210 to perform the check clearing operations. As described with respect to the system 100 of FIG. 1, check clearing operations are used by banks to do the final settlement of the check 108, such as removing funds from the account of the payor and transferring those funds to the user's bank. The user's bank may choose to make the funds available to the user 102 immediately and take on the risk that the check 108 does not clear. However, for various reasons, the bank may only make 65 those funds available to the user 102 after the check 108 finally clears.

6

FIG. 3 is a diagram of an example image 230 comprising a check image 247, a background image 250, and an alignment guide 235. The alignment guide 235 may be overlaid on the camera feed of the mobile device 106, in an implementation. The alignment guide 235 is provided in FIG. 3 as a three sided bounding box (e.g., a rectangle in which one of the line segments or sides is removed), but any shape(s) or indicator(s) may be used, such as vertical bars, parallel lines, a circle, a square, a bounding rectangle, or a self-crop tool, for example. Any aspect ratio may be used for the alignment guide, and in an implementation, the aspect ratio may correspond to that of a personal check or a business check.

The image 230 may be provided in the field of view of the camera 207 during image capture of the check 108. The user 102 may move the camera 207 or the check 108 so that the check image 247 appears within or lines up with the alignment guide 235. Some of the background image 250 (e.g., the background on which the check 108 is placed during capture of the image of the check 108) may also be within the alignment guide 235.

When the check image 247 is within the alignment guide 235 (e.g., the edges 245 of the check image 247 are aligned with respect to the alignment guide 235, such as parallel to the associated portion of the alignment guide 235), the check image 247 and the background image 250 (if any) that are within the alignment guide may be captured either automatically (e.g., by the camera or the mobile device under direction of an application running on the camera 207 or the mobile device 106 or the financial institution) or manually (e.g., by the user 102 pressing a button or making a selection on the camera 207 or the mobile device 106).

The digital image thus captured may be provided from the mobile device 106 to a financial institution. The check 108 may be deposited in a user's bank account based on the digital image. Any technique for sending the digital image to the financial institution may be used.

In an implementation, an alignment guide may be provided that is adjustable at the mobile device 106. The adjustment may be made by the user 102, the mobile device 106 and/or the camera 207 (e.g., an application running on the mobile device 106 and/or the camera 207), and/or the financial institution 130. FIG. 4 is a diagram of an example image 260 comprising a check image 247, a background image 250, and an alignment guide 263. The alignment guide 263 is shown as a bounding rectangle, though any shape(s) or indicator(s) may be used. With a bounding rectangle, for example, used as the alignment guide 263, aligning the check means enclosing the check within the alignment guide.

The alignment guide 263 may be adjustable by the user 102 via one or more adjustment buttons, selectors, arrows, or other indicators (shown in FIG. 4 as an adjustment button 280 of the camera 207). For example the user 102 may use the adjustment button 280 to change the shape, aspect ratio, and/ or the location of the alignment guide 263 in the field of view of the camera 207. In an implementation, the user may select the alignment guide 263 using any known selection techniques (e.g., moving a cursor to the alignment guide 263, highlighting or clicking on the alignment guide 263, selecting the alignment guide 263 from a pull down menu of the camera 207 or the mobile device 106) and may use the adjustment button 280 to modify the alignment guide 263. In an implementation, the user 102 may select which alignment guide from a plurality of alignment guides is to be displayed on the field of view. The camera 207 or the mobile device may store a plurality of alignment guides, and the user 102 may use any known selection technique(s) to select an alignment guide that is be displayed on the field of view of the camera 207.

US 8,699,779 B1

The adjustment button 280 may be provided as one or more physical buttons associated with the camera 207 or the mobile device 106 or may be provided as a selectable button, for example, on a touch screen associated with the camera 207 or the mobile device 106. In an implementation, the display for the image 260 may comprise a touch screen and the adjustment button 280 may be provided on the touch screen, e.g., overlaying some of the check image 247 and/or the background image 250.

In an implementation, instead of using the adjustment button 280, the user 102 may use a finger, a stylus, or any other input device to change the shape, aspect ratio, and/or the location of the alignment guide 263 in the field of view of the camera 207. Additionally or alternatively, the user 102 may perform cropping on the image 260 prior to the image being 15 captured by the camera 207. Using any type of selection tool provided with the camera 207 or the mobile device 106, the user 102 may indicate the location of the edges 245 of the check image 247, for example. Such an indication may be used in the subsequent capture and/or processing of the image 20 of the check 108.

FIG. 5 shows a data flow diagram of a system for the deposit of a check, in accordance with an example embodiment. In the data flow diagram of FIG. 5, a client 320 is one example of the mobile device 106 of the user 102 described 25 with respect to the systems 100 and 200 of FIGS. 1 and 2, respectively. In an implementation, a server 322 may be a software component operable by the depository 204 of FIG.

The client 320 may log in to a remote deposit system 30 executed on the server 322. The login 325 may serve to authenticate the user 102 as an authorized consumer of the depository 204.

The server 322, in one example, may send instructions 330 to the client 320 that execute an application on the client 320. 35 This may include instructions that cause a software object, which may have been previously downloaded and installed (e.g., pre-installed) on the client 320, to be executed on the client 320. The software object may generate and display an alignment guide, such as the alignment guide 235 or 263, in 40 the field of view of a digital camera, such as the camera 207 associated with the mobile device 106.

In another example, the instructions 330 may include a wholly self-contained application that when delivered to the client 320 will execute and perform one or more operations 45 described herein, such as those directed to generating and displaying an alignment guide in the field of view of the camera 207. In either example, the software object may be configured to make one or more software calls 310 to the camera 207. This may be through specific software instructions to the camera. In other words, the camera's functionality may not be abstracted through any software library. In such an example, software code may be written and delivered to every different camera-equipped mobile phone.

In an alternate example, the software object may operate 55 through a software abstraction layer, such as an application programming interface (API). The software object developer may only insert code into the software object to call one or more APIs exposed by the software operating the mobile device. One example of such software is Windows Mobile by Microsoft Corporation. In the context of a Windows Mobile device, the Windows Mobile operating system (OS) has one or more APIs exposed to application developers that will translate instructions from applications into instructions operable by the camera **207** on the mobile device **106**. A 65 mobile operating system, also known as a mobile platform or a handheld operating system, is the operating system that

- 7

controls a mobile device. Other mobiles OSs include Symbian OS, iPhone OS, Palm OS, BlackBerry OS, and Android.

The software object may cause the camera 207 to generate and display an alignment guide in the field of view and/or take a picture or capture one or more images of the check 108 being deposited. These images may be captured sequentially, e.g., pursuant to the user 102 flipping the check 108 over after an image of the front of the check 108 has been captured within the alignment guide. However, each side of the check 108 may be captured by the camera 207 using similar API calls. The images may be stored in an image file 315.

Once the images of one or both sides of the check 108 are captured within the alignment guide by the camera 207, the image file 315 may be operated on by the software object of the client 320. These operations may include any of the following: deskewing, dewarping, magnetic ink character recognition (MICR), cropping (either automatically, or having the user 102 manually identify the corners and/or edges of the check 108 for example), reducing the resolution of the image, number detection, character recognition, and the like.

With respect to number and character recognition, commercial check scanners have used characteristics of the MICR encoding to detect information about the check, such as the bank's routing number and the account number. However, the characteristics that these scanners have used are the magnetic characteristic of the ink itself and these scanners have used methods similar to those of magnetic audio tape readers. In an implementation, a software object of the client 320 may optically recognize the characters on the MICR line, as a consumer mobile device such as the mobile device 106 will lack the magnetic reading ability of a commercial check scanner.

The image may be also down converted into a grayscale or black and white image, such as either in Joint Photographic Experts Group (JPEG) compliant format or in tabbed image file format (TIFF) for example. In an alternate example, the image may be formatted as a Scalable Vector Graphics (SVG) image. One of the benefits of an SVG file is a large size advantage over JPEG. In the former example, the image at some point before entry into the clearing system may be converted to TIFF format. This may be performed at the mobile device 106, wherein the camera 207 captures the image in TIFF format. However, the camera 207 of the mobile device 106 may capture the image in JPEG format, which may then be converted into TIFF either at the mobile device 106 or at the server 322. In the latter example, this may use the transmission of the TIFF image across a communications network which may be more advantageous as TIFF images are typically smaller in file size for the same size of picture as a JPEG formatted image.

The software object on the client 320 may operate by performing one or more of the operations described herein and then transmitting an image file 335 (e.g., based on image file 315 that has been processed) to the server 322 after the user 102 confirms that they do wish to deposit the check 108. Alternately, the software object may capture the image of the check 108 and transmit that image to the server 322 that in turn may perform those operations, verifies that the image quality is within acceptable thresholds, and communicates that verification back to the client 320, which can then instruct the user 102 to take a picture of the other side of the check 108. In this example, the image transmitted to the server 322 may be in any format, such as JPEG or TIFF, insofar as the server software has the ability to convert that image into a Check 21 compliant format. Alternately, the bank may output an X9.37 file to the clearing system. The Check Clearing for the 21st Century Act (or Check 21 Act) is a United States federal law that allows the recipient of a paper check to create a digital

US 8,699,779 B1

version, thereby eliminating the need for further handling of the physical document. The Check 21 standard for electronic exchange is defined in the standard DSTU X9.37-2003 ("X9.37"). It is a binary interchange format.

The server 322 may confirm (e.g., using a process confirmation 340) with the user 102 the transmission, reception, and processing of each side of the check 108 separately, or may confirm both sides at the same time. On the server side, more operations may be performed, such as signature verification. Where to perform these operations may be determined 10 by the processing power of the mobile device 106 itself, which is typically limited in computational power. However, the present discussion is not limited in any way by discussion of where certain operations are described as operating. The operations of detecting and verifying information may be 15 performed by the client 320 before the information is transmitted along with the image in the image file 335 to the server 322. Alternately, the software object(s) operating on the mobile device 106 may perform no operation other then capturing images of the front and back of the check 108 within 20 the alignment guide, receiving confirmation that the user 102 wishes to proceed, and transmitting those images to the server **322**, wherein the server **322** performs those operations.

In an implementation, after the image file 335 has been received by the server 322, the server 322 may send a process confirmation 340 to the client 320. The process confirmation 340 may request instructions from the client 320 to continue proceeding with the deposit now that the server 322 has received the image file 335. In response, the client 320 may send a deposit confirmation 345 to the server 322, instructing the server 322 to process the deposit of the check based on the image file 335 that had been received by the server 322.

FIG. 6 shows a block diagram of a client apparatus 450 for the deposit of a check, in accordance with an example embodiment. The client apparatus 450 may include one or more software objects operating on a mobile device 106, such as described above. The client apparatus 450 may include a communications module 452, a check processing module 454, and an image capture module 456. The client apparatus 450 may receive, in one example, one or more check images 40 458 captured within an alignment guide as an input and output one or more processed images 460.

In an implementation, the check images **458** may be received following a software call from the check processing module **454** to the image capture module **456**. In such an 45 implementation, the image capture module **456** may include the camera **207** contained within the mobile device **106**. Alternately, the camera **207** may be detachably coupled to the mobile device **106** such as through a secure digital (SD) slot or over any suitable communications bus, such as USB (universal serial bus).

In an implementation, the image capture module **456** may retrieve previously captured and stored image files (e.g., in local, remote, or removable storage associated with the client apparatus **450**) and send the image files to a financial institution (e.g., financial institution **130**, the server **322**, the server apparatus **570** of FIG. **7**, etc.) for processing.

In an implementation, the client apparatus **450** may comprise a browser such as a web browser, for accessing a website on the Internet or other network associated with a financial institution. The user may access the website and select a "capture image" link or similar icon, button or link, for example, displayed on the browser. Such a selection may call the image capture module **456** on the client apparatus **450**.

The communications module **452** may be configured, in 65 one example, to receive and send data signals over a suitable communications network. This may include, without limita-

10

tion, GSM/GPR3, HSDPA, CDMA, TDMA, 802.11, 802.16 and the like. While the bandwidth available to the mobile device 106 may be an implementation concern such discussion is outside the scope of the present discussion and any suitable wireless communications network is considered to be within the scope of the present discussion. With respect to the present discussion, the communications module 452 may receive one or more processed check images 460 from the check processing module 454 and may transmit them over the suitable communications network to the depository 204, as described herein.

The check processing module **454** may be configured, in one example, to cause the image capture module **456** to capture a digital image of at least one side of a check within an alignment guide provided in a field of view of the camera **207**. The alignment guide is intended to ensure that the image of the check is suitable for one or more processing tasks. For instance, if the check is rotated **45** degrees clockwise when captured, the check processing module **454** or a software object operated on the server **322** described above may be unable to optically detect information on the check.

The check processing module **454** may then perform one or more cleaning operations on the image of the check. For example, the check processing module **454** may deskew the image. Another aspect of an image that may be cleaned is a warping of the image. Warping, as used herein, is meant to denote that the check is tilted forward or back with respect to a plane that is perpendicular to a line drawn from the camera lens to the center of the check. Warping, or tilting, of the image may also lead to incorrect optical detection of the check. In an implementation, the check processing module **454** may dewarp the check image such that, in a three-dimensional space, the check would appear to be perpendicular to an imaginary line drawn from the center of the camera lens to the center of the check itself.

The check processing module **454**, in further examples, may perform one or more other cleaning or processing operations. This may include down-converting the image received from the image capture module to a suitable size, such as 200 dots per inch (DPI) resolution or in a resolution range such as 200 DPI to 400 DPI, 300 DPI to 500 DPI, etc., and/or converting the image to grayscale or black and white. Such operation(s) may reduce the file size of the check image.

Alternatively, the check processing module 454 may send instructions to the image capture module 456 to cause the image capture module 456 to capture an image of the check at a suitable resolution within an alignment guide. The check processing module 454 may additionally perform any of the following operations, in further examples: convert from JPEG to TIFF, detect check information, perform signature detection on the image of the check, and the like. The check processing module 454 may, alternatively, send the captured check image to the server described herein for such processing, and receive confirmation that the operations were completed before further operations can proceed.

One of the issues with check processing is to detect the presence of a check against whatever background is present. While a user may be instructed to place the check on a dark or black background, such instructions may not provide a positive user experience. Alternatively or additionally, edge detection may be used to detect the check. Edge detection techniques are well known and any suitable method may be used herein. Alternative or additional methodology for check detection may use tile-cropping to detect and process the check.

The size of the file sent between the mobile device and the server may be small. This runs counter with respect to auto-

Case: 23-2124 Document: 32-1 Page: 242 Filed: 03/11/2024

US 8,699,779 B1

11

matic check detection against a background. If captured in color, the contrast between check and background becomes easier. However, the processed image sent over the communications network may need to be smaller, and if the detection operation is performed by the server, it may be advantageous to convert the captured image to grayscale, or even black and white, before transmission to the server. Grayscale images are compliant with the Check 21 Act.

While "flat" is a fairly well known term to users, each user's appreciation of flat with respect to the camera lens of 10 the camera 207 associated with the mobile device 106 may result in a problem with needing to align the check image programmatically or risk rejecting a large number of check images. As the image captured is a set of pixels, a tilted image will result in a jagged polygon rather than a perfect rectangle. 15 Using convex hull algorithms, the check processing modules may create a smooth polygon around the boundary and remove the concavity of the check image. Alternatively, a rotating calipers algorithm may be used to determine the tightest fitting rectangle around the check boundary, which 20 can then be used to determine the angle of it, with that angle being used to align the check properly.

The operator of the camera 207 may introduce distortions in the image due to a perspective problem, specifically an angling of the camera vertically over the check, and the top of 25 the check is smaller than the bottom, or the reverse. A warping transformation algorithm (e.g., which may be exposed as a software call within Java advanced imaging) may be used to remove this distortion.

If user involvement is tolerated, the user may be queried to 30 supply or identify three of the four corners of the check. In such an operation, the fourth corner may be derived, showing the perimeter of the check. This may allow a software object described herein to use less computational resources in processing the image of the check.

35

FIG. 7 shows a block diagram of a server apparatus 570 for the deposit of a check, in accordance with an example embodiment. Aspects of an example server apparatus are described with respect to FIG. 10. The server apparatus 570 may include one or more software objects operating on a server operated by the depository 204 described above with respect to FIG. 2. The server apparatus 570 may include a communications module 572, a check processing module 574, and a check clearance module 576. The server apparatus 570 may receive one or more processed images 460 from a 45 mobile device 106 or a client apparatus 450 as an input and may output a file such as a Check 21 compliant file 578. The Check 21 compliant file 578 may be a file or entry in a record set that is compliant with the clearinghouse rules set forth in the Check 21 Act and may include outputting an X9.37 file, in one example.

The communications module **572** may be configured to receive a wireless communication from the mobile device **106** over any suitable communications network, such as those described above. The communications module **572** may additionally receive a communication over a different communications network than the mobile device **106** communicated on, such as receiving the communication over a TCP/IP (Transmission Control Protocol/Internet Protocol) connection from the user's communication provider.

The check processing module 574 may be configured, in one example, to perform one or more check processing operations on the processed image(s) 460 that are received. In an implementation, these operations may include any of the operations described herein with respect to the check processing module 454 of FIG. 6. The operation of signature verification may be performed by the check processing module 574

12

of the server apparatus 570 as the server apparatus 570 may interface with other systems of the depository 204 that may maintain previously verified signature samples of the user 102. Performing signature verification at the client apparatus 450 may be computationally unfeasible; additionally, there may be a security risk if the signature sample is stored on the user's own device.

A cropped grayscale image may be sent to the server apparatus 570. The server apparatus 570 may perform further processing to remove distortion such as warping. The server apparatus 570 may extract information via a TIFF conversion and determine the DPI and re-scale to the proper DPI (e.g., convert to TIFF and detect the DPI that was used in the grayscale image). In an implementation, DPI detection may run on the client apparatus 450.

The check clearance module 576 may be configured, in one example, to receive a file from the check processing module 574 and may communicate with a check clearinghouse such that a Check 21 compliant file may be delivered to the check clearinghouse and funds may be received by the depository 204. The availability of the funds to the user 102 may be delayed by this operation such that the user 102 only has access to those funds when the depository 204 receives confirmation that the check has cleared.

FIG. 8 is an operational flow of an implementation of a method 800 that may be used for deposit of a check using alignment of the check. At 810, a request for access may be received from a user (e.g., the user 102). The user may request access to a deposit system operated by a depository (e.g., the depository 204) by way of a mobile device (e.g., the mobile device 106) such as, such a cellular phone, a PDA, a handheld computing device, etc. operated by the user. The access may be through some sort of user login, in some examples. The deposit system may be configured to receive a deposit of a negotiable instrument, such as a check, money order, cashier's check, etc. from the user and clear the negotiable instrument in a suitable clearinghouse system.

At **820**, the system may initialize a software object on the mobile device. This may include sending instructions to the mobile device intended to execute a previously installed (i.e., pre-installed) software object. Alternatively, the system may send a software object to the mobile device that may execute the software object, carry out operations described herein by use of the software object, and terminate the software object. In an implementation, the system may instruct a camera associated with the mobile device to capture an image of the negotiable instrument. The system may also instruct the camera or the mobile device to generate and display an alignment guide in the field of view of the camera.

At 830, an alignment guide, such as the alignment guide 235 or 263, may be provided in the field of view of the camera. The alignment guide may be generated and displayed pursuant to instructions received at the camera or mobile device from the deposit system operated by a depository, the server 322, or the server apparatus 570, for example.

At **840**, an image of the check may be captured when the check is displayed within the alignment guide in the field of view. This may be accomplished through the software object accessing a camera associated with the mobile device (e.g., either comprised within the mobile device or separate from the mobile device). This may be done through an API exposed by the OS of the mobile device, or may be through software code customized for a specific phone and specific camera. With respect to the former, a developer of the software object may write code to the camera API(s), which may be specific to the OS and without regard to the camera on the device. In

US 8,699,779 B1

13

an implementation, the user may be directed to scale or move the captured image to ensure it is properly framed within the alignment guide.

At 850, the image may be cleaned. Cleaning may include converting the image from JPEG format to TIFF format. Other cleaning operations are described herein. Cleaning operations may also be augmented by detecting operations. The operations at 850 may be carried out on the mobile device, in an implementation, though may include sending the image to the server apparatus, which may perform one or more cleaning operations and when complete may send a notification back to the mobile device of the completion. In either instance, the image may be deskewed, dewarped, and cropped for example, at 850. Additionally, detection operations may be performed, e.g. after the cleaning operations are 15 performed. The detection operations may include any of the following, for example: optically read the MICR line, courtesy amount recognition (CAR), legal amount recognition (LAR), signature block, and payee. As discussed above, the detecting operations may be performed by the client, the 20 server, or some combination thereof.

In an implementation, an application on the mobile device may crop the image around where the alignment guide was during the image capture. Edge detection may be performed on the cropped image. In an implementation, the user may 25 manually perform cropping on the image after the application crops the image around the alignment guide's position.

At 860, the cleaned image may be transmitted to the depository. This may include transmitting the cleaned image alone to the depository, but may also include transmitting the 30 detected information on the check to the depository. In an implementation, coordinate data of the alignment guide may be provided to the depository. Such coordinate data may correspond to the coordinates of the alignment guide in the field of view of the camera or in the image generated by the camera. Alternatively or additionally, the user can identify on the display of the captured image where each of the corners of the check is and the coordinate data (e.g., pertaining to the identified corners) and/or corner identification information may be provided to the depository along with the image of the 40 check. The depository may use the coordinate data and/or corner identification information during subsequent processing such as cropping, edge detection, etc.

At **870**, the depository may receive the cleaned image of the check (along with financial information pertaining to the 45 account for depositing funds, for example) and may process the image. Processing of the digital image file may include retrieving financial information regarding the check. The financial information may comprise the MICR number, the routing number, an amount, etc. Any known image processing technology may be used, such as edge detection, filtering to remove imagery except the check image or check data in the received digital image file, image sharpening, and technologies to distinguish between the front and the back sides of the check. The depository may identify and/or remove at least 55 a portion of data that is extraneous to the check, such as background data.

After retrieving the financial information from the check in an electronic data representation form, the depository may determine whether the financial information such as the 60 amount payable to the user, the account associated with the user to deposit funds, an account associated with a payor to debit funds, and an institution associated with the payor, etc., may be valid. For example, the depository may include electronic devices such as computers, servers, databases, or the 65 like that may be in communication with each other. The electronic devices may receive an electronic data representa-

14

tion and may perform an analysis on the quality of the data representation, the readability of the data representation, or the like. For example, the electronic devices may determine whether the account number, amount payable, or the like may be readable such that they may be parsed and processed by the depository to credit an account associated with the user.

If the financial information is determined to be valid, the electronic data representation may be processed by the depository, thereby depositing the money in the user's account. If the financial information is determined to be invalid, then the user may be advised. For example, the depository may transmit an email, a web message, an instant message, or the like to the user indicating that the financial information associated with the electronic data representation may be invalid. The user may determine how to proceed by selecting an option on the web message, replying to the email, or the like.

Thus, in an implementation, instructions on how the user would like to proceed may be requested from the user, such as whether the user would like to try the deposit again (e.g., make another image of the check within the alignment guide and send it to the depository) or whether the user would like assistance from a representative, for example. The user may indicate how they would like to proceed.

If the user would like assistance, the financial information may be transferred to a representative for further review. The representative may review the financial information associated with the electronic data representation to determine whether to allow the electronic data representation to be processed by the depository. If so, the electronic data representation of the financial information may be processed by the depository, thereby depositing the check in the user's account. The depository may send a notice to the user via email, facsimile, instant message, or mail, for example, that the check has been deposited into the selected account.

FIG. 9 is an operational flow of another implementation of a method 900 that may be used for deposit of a check using alignment of the check. A user (e.g., the user 102) may receive and endorse a check (e.g., the check 108) at 910 and open a communication pathway with an institution (e.g., the financial institution 130), at 920. In an implementation, the user may open a communication pathway with the institution by logging into a website of the institution, for example. There may be several ways in which a communication pathway may be established, including, but not limited to, an Internet connection via a website of the institution. The user may access the website and log into the website using credentials, such as, but not limited to, a username and a password.

At 930, the user may send a request to deposit the check and may select an account in which to deposit the check. In an implementation, the user may select a "deposit check" option provided on the website, and may enter details such as check amount, date, the account the check funds should be deposited in, comments, etc.

At 940, an alignment guide may be provided in the field of view of the camera that is used to create a digital image of the check. The alignment guide, such as the alignment guide 263, may be adjustable, e.g., using an adjustment button, such as the adjustment button 280, or other selection and adjustment techniques.

The user may position the camera and the check such that the check is in the field of view of the camera, and at 950, may manually adjust the alignment guide and/or the check so that the alignment guide is adjusted with respect to the image of the check that is displayed in the field of view. Alternatively, the camera, the mobile device, or the institution may adjust the alignment guide without user intervention so that the

US 8,699,779 B1

15

image of the check that is displayed in the field of view is positioned within the alignment guide. In an implementation, the camera, the mobile device, or the institution may provide feedback to the user regarding the alignment guide and the positioning of the check with respect to the alignment guide.

At 960, when the image of the check is within the alignment guide, a digital image of the check may be created using the camera. In an implementation, the user may instruct the camera (e.g., by pressing a button on the camera or the mobile device) to create the digital image. In another implementation, the camera may automatically create the digital image as soon as the image of the check is within the alignment guide. In this manner, the user may point the camera at the check such that the image of the check appears in the field of view, and after the alignment guide has been adjusted (either by the 15 user or automatically by the camera, the mobile device, or the financial institution via a communications network) and/or the check has been repositioned within the alignment guide by the user, a digital image of the check may be created without further user intervention. Depending on the imple- 20 mentation, one or more digital images of the check (e.g., corresponding to the front and back of the check) may be created using such techniques.

At 970, the digital image(s) may be uploaded to the institution using any known image upload process. In an implementation, the upload may be augmented by secondary data which may be information relating to the deposit of the check, such as an account number and a deposit amount, for example. At 980, when the institution has received the digital images (e.g., of the front and back sides of the check), the institution may process the digital images to obtain an image of the check and to deposit the funds of the check in the user's account, as described herein.

It is contemplated that processing such as grayscale conversion, image cropping, image compression, dewarping, 35 edge and/or corner detection, etc. may be implemented in the method 900. Such operations may be performed on one or more digital images created by the camera and may be performed on the image(s) by the mobile device and/or by the institution, as described further above.

Although the examples described herein may refer to uploading of images of checks to an institution, it is contemplated that any negotiable instrument or image (e.g., vehicle accident pictures provided to an insurance company) may be processed and/or transmitted using the techniques described 45 herein. Additionally, one or more of the techniques described herein may be performed by the institution instead of the mobile device of the user.

FIG. 10 is a block diagram of an example computing environment in which example embodiments and aspects may be 50 implemented. The computing system environment is only one example of a suitable computing environment and is not intended to suggest any limitation as to the scope of use or functionality.

Numerous other general purpose or special purpose computing system environments or configurations may be used. Examples of well known computing systems, environments, and/or configurations that may be suitable for use include, but are not limited to, personal computers (PCs), server computers, handheld or laptop devices, multiprocessor systems, microprocessor-based systems, network PCs, minicomputers, mainframe computers, embedded systems, distributed computing environments that include any of the above systems or devices, and the like.

Computer-executable instructions, such as program modules, being executed by a computer may be used. Generally, program modules include routines, programs, objects, com16

ponents, data structures, etc. that perform particular tasks or implement particular abstract data types. Distributed computing environments may be used where tasks are performed by remote processing devices that are linked through a communications network or other data transmission medium. In a distributed computing environment, program modules and other data may be located in both local and remote computer storage media including memory storage devices.

With reference to FIG. 10, a system 1000 includes a computer 1010 connected to a network 1014. The computer 1010 includes a processor 1020, a storage device 1022, an output device 1024, an input device 1026, and a network interface device 1028, all connected via a bus 1030. The processor 1020 represents a central processing unit of any type of architecture, such as a CISC (Complex Instruction Set Computing), RISC (Reduced Instruction Set Computing), VLIW (Very Long Instruction Word), or a hybrid architecture, although any appropriate processor may be used. The processor 1020 executes instructions and includes that portion of the computer 1010 that controls the operation of the entire computer. Although not depicted in FIG. 10, the processor 1020 typically includes a control unit that organizes data and program storage in memory and transfers data and other information between the various parts of the computer 1010. The processor 1020 receives input data from the input device 1026 and the network 1014 reads and stores code and data in the storage device 1022 and presents data to the output device 1024.

Although the computer 1010 is shown to contain only a single processor 1020 and a single bus 1030, the disclosed embodiment applies equally to computers that may have multiple processors and to computers that may have multiple busses with some or all performing different functions in different ways.

The storage device 1022 represents one or more mechanisms for storing data. For example, the storage device 1022 may include read-only memory (ROM), RAM, magnetic disk storage media, optical storage media, flash memory devices, and/or other machine-readable media. In other embodiments, any appropriate type of storage device may be used. Although only one storage device 1022 is shown, multiple storage devices and multiple types of storage devices may be present. Further, although the computer 1010 is drawn to contain the storage device 1022, it may be distributed across other computers, for example on a server.

The storage device 1022 includes a controller (not shown in FIG. 10) and data items 1034. The controller includes instructions capable of being executed on the processor 1020 to carry out the functions as previously described herein with reference to FIGS. 1-9. In another embodiment, some or all of the functions are carried out via hardware in lieu of a processor-based system. In one embodiment, the controller is a web browser, but in other embodiments the controller may be a database system, a file system, an electronic mail system, a media manager, an image manager, or may include any other functions capable of accessing data items. The storage device 1022 may also contain additional software and data (not shown), which is not necessary to understand the invention. Although the controller and the data items 1034 are shown to be within the storage device 1022 in the computer 1010, some or all of them may be distributed across other systems, for example on a server and accessed via the network 1014.

The output device 1024 is that part of the computer 1010 that displays output to the user. The output device 1024 may be a liquid crystal display (LCD) well-known in the art of computer hardware. In other embodiments, the output device 1024 may be replaced with a gas or plasma-based flat-panel

US 8,699,779 B1

17

display or a traditional cathode-ray tube (CRT) display. In still other embodiments, any appropriate display device may be used. Although only one output device 1024 is shown, in other embodiments any number of output devices of different types, or of the same type, may be present. In an embodiment, 5 the output device 1024 displays a user interface.

The input device 1026 may be a keyboard, mouse or other pointing device, trackball, touchpad, touch screen, keypad, microphone, voice recognition device, or any other appropriate mechanism for the user to input data to the computer 1010 and manipulate the user interface previously discussed. Although only one input device 1026 is shown, in another embodiment any number and type of input devices may be present.

The network interface device 1028 provides connectivity 15 from the computer 1010 to the network 1014 through any suitable communications protocol. The network interface device 1028 sends and receives data items from the network 1014.

The bus **1030** may represent one or more busses, e.g., USB, 20 PCI, ISA (Industry Standard Architecture), X-Bus, EISA (Extended Industry Standard Architecture), or any other appropriate bus and/or bridge (also called a bus controller).

The computer 1010 may be implemented using any suitable hardware and/or software, such as a personal computer or other electronic computing device. Portable computers, laptop or notebook computers, PDAs, pocket computers, appliances, telephones, and mainframe computers are examples of other possible configurations of the computer 1010. For example, other peripheral devices such as audio adapters or chip programming devices, such as EPROM (Erasable Programmable Read-Only Memory) programming devices may be used in addition to, or in place of, the hardware already depicted.

The network 1014 may be any suitable network and may 35 support any appropriate protocol suitable for communication to the computer 1010. In an embodiment, the network 1014 may support wireless communications. In another embodiment, the network 1014 may support hard-wired communications, such as a telephone line or cable. In another embodi- 40 ment, the network 1014 may support the Ethernet IEEE (Institute of Electrical and Electronics Engineers) 802.3x specification. In another embodiment, the network 1014 may be the Internet and may support IP (Internet Protocol). In another embodiment, the network 1014 may be a LAN or a 45 WAN. In another embodiment, the network 1014 may be a hotspot service provider network. In another embodiment, the network 1014 may be an intranet. In another embodiment, the network 1014 may be a GPRS (General Packet Radio Service) network. In another embodiment, the network 1014 50 may be any appropriate cellular data network or cell-based radio network technology. In another embodiment, the network 1014 may be an IEEE 802.11 wireless network. In still another embodiment, the network 1014 may be any suitable network or combination of networks. Although one network 55 1014 is shown, in other embodiments any number of networks (of the same or different types) may be present.

It should be understood that the various techniques described herein may be implemented in connection with hardware or software or, where appropriate, with a combination of both. Thus, the methods and apparatus of the presently disclosed subject matter, or certain aspects or portions thereof, may take the form of program code (i.e., instructions) embodied in tangible media, such as floppy diskettes, CD-ROMs, hard drives, or any other machine-readable storage 65 medium wherein, when the program code is loaded into and executed by a machine, such as a computer, the machine

18

becomes an apparatus for practicing the presently disclosed subject matter. In the case of program code execution on programmable computers, the computing device generally includes a processor, a storage medium readable by the processor (including volatile and non-volatile memory and/or storage elements), at least one input device, and at least one output device. One or more programs may implement or use the processes described in connection with the presently disclosed subject matter, e.g., through the use of an API, reusable controls, or the like. Such programs may be implemented in a high level procedural or object-oriented programming language to communicate with a computer system. However, the program(s) can be implemented in assembly or machine language, if desired. In any case, the language may be a compiled or interpreted language and it may be combined with hardware implementations.

Although exemplary embodiments may refer to using aspects of the presently disclosed subject matter in the context of one or more stand-alone computer systems, the subject matter is not so limited, but rather may be implemented in connection with any computing environment, such as a network or distributed computing environment. Still further, aspects of the presently disclosed subject matter may be implemented in or across a plurality of processing chips or devices, and storage may similarly be effected across a plurality of devices. Such devices might include personal computers, network servers, and handheld devices, for example.

Although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed as example forms of implementing the claims.

What is claimed:

- 1. A system for depositing a check, comprising:
- a mobile device having a camera, a display and a processor, wherein the processor is configured to:
 - project an alignment guide in the display of the mobile device, the display of the mobile device displaying a field of view of the camera;
 - monitor an image of the check that is within the field of view;
 - determine whether the image of the check aligns with the alignment guide;
 - automatically capture the image of the check when the image of the check is determined to align with the alignment guide; and
- transmit the captured image of the check from the camera to a depository via a communication pathway between the mobile device and the depository.
- 2. The system of claim 1, wherein the processor is further configured to
 - obtain financial information pertaining to the check from the captured image of the check.
- 3. The system of claim 1, wherein the processor is further configured to receive instructions inputted to the mobile device for adjusting the alignment guide, and adjust the alignment guide according to the received instructions.
- **4.** The system of claim **1**, wherein the processor is further configured to crop the image of the check around the alignment guide prior to transmitting the image to the depository.
- 5. The system of claim 1, wherein the processor is further configured to provide corner identification information pertaining to the image of the check, and control the mobile device to transmit the corner identification information to the depository.

US 8,699,779 B1

19

- 6. The system of claim 1, wherein the alignment guide is comprised of a three sided opened box.
- 7. The system of claim 1, wherein the processor is configured to determine the image of the check aligns with the alignment guide when at least one edge of the image of the check aligns with at least one line portion of the alignment guide.
- 8. The system of claim 1, wherein the processor is configured to determine the image of the check aligns with the alignment guide when at least a first edge and second edge of $\ ^{10}$ the image of the check aligns parallel, respectively, to a first line portion and a second line portion of the alignment guide.
- 9. The system of claim 1, wherein the processor is configured to determine the image of the check aligns with the alignment guide when at least a first edge, second edge and a 15 third edge of the image of the check aligns parallel, respectively, to a first line portion, second line portion and a third line portion of the alignment guide.
- 10. A non-transitory computer-readable medium comprising instructions for depositing a check, said instructions being 20 executed by a processor of a mobile device to:

project an alignment guide in a display of the mobile device, the display of the mobile device displaying a field of view of a camera of the mobile device;

monitor an image of the check that is within the field of 25 view of the camera;

determine whether the image of the check aligns with the alignment guide;

automatically capture the image of the check when the image of the check is determined to align with the align- 30 ment guide; and

transmit the image of the check from the mobile device to a deposit system.

- 11. The non-transitory computer-readable medium of claim 10, wherein the instructions are further executed by the 35 processor to clean the image of the check prior to transmitting the image to the deposit system.
- 12. The non-transitory computer-readable medium of claim 11, wherein cleaning the image comprises at least cropping the image of the check around the alignment guide and 40 performing edge detection on the image of the check.
- 13. The non-transitory computer-readable medium of claim 10, wherein the instructions are further executed by the processor to adjust the alignment guide according to received inputs corresponding to an adjustment button of the camera. 45
- 14. The non-transitory computer-readable medium of claim 10, wherein the instructions are further executed by the processor to adjust the alignment guide so that the image of the check is displayed within the alignment guide.
- 15. The non-transitory computer-readable medium of 50 claim 10, wherein the instructions are further executed by the processor to determine the image of the check aligns with the alignment guide when at least one edge of the image of the check aligns with at least one line portion of the alignment guide.
- 16. The non-transitory computer-readable medium of claim 10, wherein the instructions are further executed by the processor to determine the image of the check aligns with the

20

alignment guide when at least a first edge, second edge and a third edge of the image of the check aligns parallel, respectively, to a first line portion, second line portion and a third line portion of the alignment guide.

- 17. The non-transitory computer-readable medium of claim 10, wherein the instructions are further executed by the processor to determine the image of the check aligns with the alignment guide when at least a first edge and second edge of the image of the check aligns parallel, respectively, to a first line portion and a second line portion of the alignment guide.
- 18. The non-transitory computer-readable medium of claim 10, wherein the alignment guide is comprised of a three sided opened box.
- 19. A non-transitory computer-readable medium comprising computer-readable instructions for depositing a check, said computer-readable instructions being executed by a pro-

receive at a server a request for access to a deposit system from a mobile device;

receive at the server an image of the check from the mobile device, wherein at least an edge of the image of the check has been aligned with an alignment guide;

clean the image of the check at a check processing module of the server using information corresponding to the alignment guide; and

deposit funds of the check into an account associated with the deposit system using the cleaned image of the check.

- 20. The non-transitory computer-readable medium of claim 19, wherein the computer-readable instructions are further executed by the processor to clean the image of the check at the check processing module by using corner identification information pertaining to corners of the check in the image of the check, wherein the corner identification information is received from the mobile device.
- 21. The non-transitory computer-readable medium of claim 19, wherein the computer-readable instructions are further executed by the processor to send a self-contained software object to the mobile device that when executed on the mobile device causes the mobile device to automatically capture the image of the check when the image of the check aligns with the alignment guide.
- 22. The non-transitory computer-readable medium of claim 19, wherein the computer-readable instructions are further executed by the processor to send instructions to the mobile device that when executed on the mobile device causes the mobile device to initialize a pre-installed software object on the mobile device directed to providing the alignment guide in a display of the mobile device, wherein the display is configured to display a field of view of a camera of the mobile device and the camera is configured to automatically capture the image of the check when the image of the check aligns with the alignment guide.
- 23. The non-transitory computer-readable medium of claim 19, wherein the computer-readable instructions are further executed by the processor to clean the image of the check by cropping the image of the check around the alignment guide.

Case: 23-2124 Document: 32-1 Page: 247 Filed: 03/11/2024

Case: 23-2124 Document: 14 Page: 1 Filed: 08/21/2023

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner/Appellant,

Appeal Nos. 2023-2124¹ 2023-2125

v.

PNC BANK N.A., Petitioner/Appellee.

Proceeding Nos.: IPR2021-01070 and IPR2021-01073

NOTICE FORWARDING CERTIFIED LISTS

Notices of Appeal to the United States Court of Appeals for the Federal Circuit were timely filed by Patent Owner on June 30, 2023, in the United States Patent and Trademark Office in connection with the above identified *Inter Partes* Review proceedings. Pursuant to 35 U.S.C. § 143, Certified Lists are this day being forwarded to the Federal Circuit.

Respectfully submitted,

Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office

By: Huyen H. Naugen Date: August 16, 2023

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571-272-9035

Appeal No. 2023-2124 (Lead) is consolidated with Appeal No. 2023-2125 (Consolidated Member) pursuant to Court's Order (ECF No. 10) and Note to File (ECF No. 11) dated July 28, 2023.

Document: 32-1 Page: 248 Case: 23-2124 Filed: 03/11/2024

Case: 23-2124 Document: 14 Page: 2 Filed: 08/21/2023

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true and correct copy of the foregoing NOTICE FORWARDING CERTIFIED LISTS has been served, by electronic mail, on counsel for the Appellant and Appellee on this 16th day of August, 2023, as follows:

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U.S. DEPARTMENT OF COMMERCE United States Patent and Trademark Office

August 16, 2023

(Date)

THIS IS TO CERTIFY that the attached document is a list of the papers that comprise the record before the Patent Trial and Appeal Board (PTAB) for the *Inter Partes Review* proceeding identified below.

PNC BANK N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

Case IPR2021-01070 U. S. Patent 8,699,779 B2

By authority of the DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE





Prosecution History for IPR2021-01070

Date	Document
07/07/2021	Petition for <i>Inter Partes</i> Review of U.S. Patent No. 8,699,779
07/07/2021	Petitioner's Power of Attorney
07/07/2021	Petitioner's Fee Authorization
07/22/2021	Patent Owner's Mandatory Notice
07/22/2021	Patent Owner's Power of Attorney
07/23/2021	Notice of Filing Date Accorded to Petition and Time for Filing Patent Owner's Preliminary Response
10/25/2021	Joint Motion to Seal Pursuant to Proposed Protective Order
10/25/2021	Patent Owner's Preliminary Response [CONFIDENTIAL]
11/01/2021	Patent Owner's Preliminary Response [REDACTED]
11/12/2021	Order Authorizing Reply and Sur-Reply
11/29/2021	Petitioner's Motion to Seal
11/29/2021	Petitioner's Reply to Patent Owner's Preliminary Response [CONFIDENTIAL]
12/01/2021	Petitioner's Updated Exhibit List
12/07/2021	Petitioner's Reply to Patent Owner's Preliminary Response [REDACTED]
12/10/2021	Joint Motion to Seal Sur-Reply
12/10/2021	Patent Owner's Preliminary Sur-Reply [CONFIDENTIAL]
12/10/2021	Patent Owner's First Updated Exhibit List
12/17/2021	Patent Owner's Preliminary Sur-Reply [REDACTED]
01/13/2022	Panel Change Order
01/24/2022	Decision - Institution of Inter Partes Review [CONFIDENTIAL]
01/24/2022	Scheduling Order
01/24/2022	Order Granting Joint Motions to Seal and Entry of Protective Order
01/28/2022	Petitioner's Updated Mandatory Notices
02/07/2022	Petitioner's Objections to Evidence
02/07/2022	Decision - Institution of <i>Inter Partes</i> Review [PUBLIC VERSION]
02/07/2022	Patent Owner's Objections to Evidence
02/28/2022	Joint Notice of Stipulation to Adjust Schedule [EXPUNGED]
03/07/2022	Joint Notice of Stipulation to Adjust Schedule

Date	Document
04/13/2022	Patent Owner's Notice of Deposition of Dr. Todd Mowry
04/15/2022	Petitioner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Gregory H. Lantier [EXPUNGED]
04/15/2022	Petitioner's Updated Mandatory Notices
04/18/2022	Petitioner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Gregory H. Lantier
04/20/2022	Patent Owner's Amended Notice of Deposition of Dr. Todd Mowry
04/22/2022	Order Granting Petitioner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Gregory H. Lantier
04/28/2022	Patent Owner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Jason G. Sheasby
05/02/2022	Patent Owner's Response
05/03/2022	Patent Owner's Updated Exhibit List
05/09/2022	Order Granting Patent Owner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Jason G. Sheasby
05/10/2022	Petitioner's Objections to Evidence Submitted With Patent Owner's Response
06/01/2022	Corrected Patent Owner's Response
06/08/2022	Petitioner's Supplemental Objections to Evidence Submitted With Patent Owner's Response
07/20/2022	Petitioner's Notice of Deposition of Dr. Charles Creusere
08/08/2022	Petitioner's Reply to Patent Owner's Response
08/15/2022	Patent Owner's Objections to Evidence
08/23/2022	Patent Owner's Motion to File Supplemental Information
08/23/2022	Patent Owner's Updated Exhibit List
08/30/2022	Petitioner's Authorized Response to Patent Owner's Motion to File Supplemental Information
08/30/2022	Petitioner's Updated Exhibit List
09/02/2022	Joint Notice of Stipulation to Adjust Schedule
09/12/2022	Petitioner's Request for Oral Argument
09/12/2022	Patent Owner's Request for Oral Argument
09/14/2022	Order Granting Patent Owner's Motion to File Supplemental Information
09/14/2022	Patent Owner's Updated Exhibit List

Date	Document
09/19/2022	Patent Owner's Notice of Deposition of Dr. Todd Mowry
09/19/2022	Patent Owner's Amended Notice of Deposition of Dr. Todd Mowry
09/21/2022	Petitioner's Objections to Evidence Submitted as Supplemental Information
09/22/2022	Order Setting Oral Argument
09/30/2022	Patent Owner's Sur-Reply
10/03/2022	Patent Owner's Motion to Exclude Evidence
10/04/2022	Petitioner's Updated Exhibit List
10/11/2022	Petitioner's Opposition to Patent Owner's Motion to Exclude Evidence
10/11/2022	Petitioner's Updated Exhibit List
10/18/2022	Patent Owner's Reply in Support of Motion to Exclude Evidence
10/20/2022	Petitioner's Demonstrative Exhibits
10/20/2022	Patent Owner's Updated Exhibit List
10/20/2022	Patent Owner's Objections to Petitioner's Demonstratives
11/28/2022	Oral Hearing Transcript
01/19/2023	Final Written Decision
02/02/2023	Petitioner's Updated Mandatory Notices
02/21/2023	Patent Owner's Request for Rehearing
02/23/2023	Notification of Receipt of Precedential Opinion Panel (POP) Request
03/29/2023	Order Denying POP Request
04/28/2023	Order Denying Patent Owner's Request for Rehearing
05/03/2023	Petitioner's Motion to Exclude Confidential Information
05/30/2023	Order Granting Petitioner's Motion to Expunge Confidential Information
06/30/2023	Patent Owner's Notice of Appeal

U.S. DEPARTMENT OF COMMERCE United States Patent and Trademark Office

August 16, 2023

(Date)

THIS IS TO CERTIFY that the attached document is a list of the papers that comprise the record before the Patent Trial and Appeal Board (PTAB) for the *Inter Partes Review* proceeding identified below.

PNC BANK, N.A. Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

Case IPR2021-01073 U. S. Patent 8,977,571 B2

By authority of the DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

Huyen H. Nguyen
Cernfying Officer



Prosecution History for IPR2022-01073

Date	Document	
07/07/2021	Petition for Inter Partes Review of U.S. Patent No. 8,977,571	
07/07/2021	Petitioner's Power of Attorney	
07/07/2021	Petitioner's Fee Authorization	
07/22/2021	Patent Owner's Mandatory Notice	
07/22/2021	Patent Owner's Power of Attorney	
07/28/2021	Notice of Filing Date Accorded to Petition and Time for Filing Patent Owner's Preliminary Response	
10/28/2021	Joint Motion to Seal Pursuant to Proposed Protective Order	
10/28/2021	Patent Owner's Preliminary Response [CONFIDENTIAL]	
11/03/2021	Patent Owner's Preliminary Response [REDACTED]	
11/12/2021	Order Authorizing Reply and Sur-Reply	
11/29/2021	Petitioner's Motion to Seal	
11/29/2021	Petitioner's Reply to Patent Owner's Preliminary Response [CONFIDENTIAL]	
12/01/2021	Petitioner's Updated Exhibit List	
12/07/2021	Petitioner's Reply to Patent Owner's Preliminary Response [REDACTED]	
12/10/2021	Joint Motion to Seal Sur-Reply	
12/10/2021	Patent Owner's Preliminary Sur-Reply [CONFIDENTIAL]	
12/10/2021	Patent Owner's First Updated Exhibit List	
12/17/2021	Patent Owner's Preliminary Sur-Reply [REDACTED]	
01/13/2022	Panel Change Order	
01/24/2022	Decision - Institution of Inter Partes Review [CONFIDENTIAL]	
01/24/2022	Scheduling Order	
01/24/2022	Order Granting Joint Motions to Seal and Entry of Protective Order	
01/28/2022	Petitioner's Updated Mandatory Notices	
02/07/2022	Petitioner's Objections to Evidence	
02/07/2022	Decision - Institution of <i>Inter Partes</i> Review [PUBLIC VERSION]	
02/07/2022	Patent Owner's Objections to Evidence	
02/28/2022	Joint Notice of Stipulation to Adjust Schedule [EXPUNGED]	
03/07/2022	Joint Notice of Stipulation to Adjust Schedule	

Date	Document	
04/13/2022	Patent Owner's Notice of Deposition of Dr. Todd Mowry	
04/15/2022	Petitioner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Gregory H. Lantier [EXPUNGED]	
04/15/2022	Petitioner's Updated Mandatory Notices	
04/18/2022	Petitioner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Gregory H. Lantier	
04/20/2022	Petitioner's Submission to Replace Exhibit 1004	
04/20/2022	Patent Owner's Amended Notice of Deposition of Dr. Todd Mowry	
04/22/2022	Order Granting Petitioner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Gregory H. Lantier	
04/28/2022	Patent Owner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Jason G. Sheasby	
05/02/2022	Patent Owner's Response [EXPUNGED]	
05/02/2022	Patent Owner's Response	
05/05/2022	Patent Owner's Updated Exhibit List	
05/09/2022	Order Granting Patent Owner's Unopposed Motion for <i>Pro Hac Vice</i> Admission of Jason G. Sheasby	
05/10/2022	Petitioner's Objections to Evidence Submitted With Patent Owner's Response	
06/01/2022	Corrected Patent Owner's Response	
06/08/2022	Petitioner's Supplemental Objections to Evidence Submitted With Patent Owner's Response	
07/20/2022	Petitioner's Notice of Deposition of Dr. Charles Creusere	
08/08/2022	Petitioner's Reply to Patent Owner's Response	
08/15/2022	Patent Owner's Objections to Evidence	
08/23/2022	Patent Owner's Motion to File Supplemental Information	
08/23/2022	Patent Owner's Updated Exhibit List	
08/30/2022	Petitioner's Authorized Response to Patent Owner's Motion to File Supplemental Information	
08/30/2022	Petitioner's Updated Exhibit List	
09/02/2022	Joint Notice of Stipulation to Adjust Schedule	
09/12/2022	Petitioner's Request for Oral Argument	
09/12/2022	Patent Owner's Request for Oral Argument	

Date	Document	
09/14/2022	Order Granting Patent Owner's Motion to File Supplemental Information	
09/14/2022	Patent Owner's Updated Exhibit List	
09/19/2022	Patent Owner's Notice of Deposition of Dr. Todd Mowry	
09/19/2022	Patent Owner's Amended Notice of Deposition of Dr. Todd Mowry	
09/21/2022	Petitioner's Objections to Evidence Submitted as Supplemental Information	
09/22/2022	Order Setting Oral Argument	
09/30/2022	Patent Owner's Sur-Reply	
10/03/2022	Patent Owner's Motion to Exclude Evidence	
10/04/2022	Petitioner's Updated Exhibit List	
10/11/2022	Petitioner's Opposition to Patent Owner's Motion to Exclude Evidence	
10/11/2022	Petitioner's Updated Exhibit List	
10/18/2022	Patent Owner's Reply in Support of Motion to Exclude Evidence	
10/20/2022	Petitioner's Demonstrative Exhibits	
10/20/2022	Patent Owner's Updated Exhibit List	
10/20/2022	Patent Owner's Objections to Petitioner's Demonstratives	
11/28/2022	Oral Hearing Transcript	
11/30/2022	Patent Owner's Motion to File Supplemental Information	
12/07/2022	Petitioner's Opposition to Patent Owner's Motion for Late Submission of Supplemental Information	
01/19/2023	Final Written Decision	
02/02/2023	Petitioner's Updated Mandatory Notices	
02/21/2023	Patent Owner's Request for Rehearing	
02/23/2023	Notification of Receipt of Precedential Opinion Panel (POP) Request	
03/29/2023	Order Denying POP Request	
04/28/2023	Order Denying Patent Owner's Request for Rehearing	
05/03/2023	Petitioner's Motion to Expunge Confidential Information	
05/30/2023	Order Granting Petitioner's Motion to Expunge Confidential Information	
06/23/2023	Patent Owner's Request for Extension of Time to File A Notice of Appeal	
06/30/2023	Patent Owner's Notice of Appeal	

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

DOCKET NO.: 1652875-00151US1 Filed on behalf of PNC Bank, N.A.

By: Monica Grewal, Reg. No. 40,056 (Lead Counsel)

David Cavanaugh, Reg. No. 36,476 (First Backup Counsel)

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A. Petitioner

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION Patent Owner

Case IPR2021-01073

U.S. Patent No. 8,977,571

PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 8,977,571 CHALLENGING CLAIMS 1-6, 9, 10, 12, 13 UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

TABLE OF CONTENTS

I.	INTR	RODUCTION1			
II.	MAN	DATORY NOTICES	3		
	A.	Real Party-In-Interest	3		
	B.	Related Matters	3		
	C.	Counsel	4		
	D.	Service Information	4		
III.	CER	ΓΙFICATION OF GROUNDS FOR STANDING	5		
IV.	OVE	RVIEW OF CHALLENGE AND RELIEF REQUESTED	5		
	A.	Prior Art Patents and Printed Publications	5		
		1. Nepomniachtchi is Entitled to its Provisional Filing Date	7		
	B.	Grounds of Challenge	9		
V.	TECI	HNICAL BACKGROUND	9		
	A.	Remote Check Deposit using Mobile Devices	9		
	B.	Image Monitoring and Capture	12		
VI.	THE	'571 PATENT	15		
	A.	Overview	15		
	B.	Prosecution History	19		
	C.	Conception and Reduction to Practice	20		
VII.	LEV	EL OF ORDINARY SKILL IN THE ART	20		
VIII.	CLA	IM CONSTRUCTION	21		
	A.	"feedback regarding the image of the check with respect to the monitoring criterion"			
IX.	OVE	RVIEW OF PRIOR ART			
	A.	Acharya	26		
	В.	<i>Luo</i>			
X.	-	CIFIC GROUNDS FOR UNPATENTABILITY			
•	A.	Ground I: Claims 1-3, 6, 9, 10, and 13 Would Have Been	.50		
		Obvious Over <i>Acharya</i> In View of <i>Luo</i>	33		

Page: 259 Document: 32-1 Filed: 03/11/2024 Case: 23-2124

		Petition for <i>Inter Partes</i> Report of U.S. Patent No. 8,977	
	1.	Combination of Acharya and Luo ("Acharya/Luo")	33
	2.	Independent Claim 1	40
	3.	Dependent Claim 2	58
	4.	Dependent Claim 3	62
	5.	Dependent Claim 6	64
	6.	Independent Claim 9	65
	7.	Dependent Claim 10	68
	8.	Dependent Claim 13	71
В.		nd II: Claims 4 and 5 of the '571 Patent Would Have Been ous over <i>Acharya</i> combined with <i>Luo</i> and <i>Nepomniachtchi</i>	73
	1.	Combination of Acharya/Luo and Nepomniachtchi	73
	2.	Dependent Claim 4	75
	3.	Dependent Claim 5	77
C.		nd III: Claim 12 of the '571 Patent Would Have Been ous over <i>Acharya/Luo</i> in view of <i>Yoon</i>	78
	1.	Dependent Claim 12	78
DISC	RETIC	ONARY DENIAL IS NOT WARRANTED	83
A.		t Owner Believes the Co-Pending Litigation Should Not nt IPR Institution	83

Fintiv Factors Favor Institution......83

New Prior Art and Arguments Favor Institution84

CONCLUSION.....85

B.

C.

XI.

XII.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

I. INTRODUCTION

U.S. Patent No. 8,977,571 (the "'571 patent") reuses known mobile technologies for capturing document images that are suitable for performing optical character recognition. Although the '571 patent is specifically directed to capturing images of checks, it does not claim any special techniques for checks that have not already been applied to other kinds of documents. It is unpatentable at least because remote check deposit implemented on camera phones predates the '571 patent, as does complementary prior art (also using camera phones) that teaches monitoring of document features to improve image capture for optical character recognition.

More specifically, claim 1 of the '571 patent recites "computer-readable instructions" to "monitor an image of [a] check" and to "capture [an] image of the check with the camera" on a mobile device. Among other things, the claim recites that the check image is monitored "with respect to a monitoring criterion" and that the check image is captured "when the image of the check passes the monitoring criterion." The check image is provided to "a depository via a communication pathway between the mobile device and the depository."

These concepts were disclosed in prior art that was not considered during prosecution. As discussed below, U.S. Patent No. 8,768,836 to *Acharya* discloses software for capturing an image of a check using the digital camera of a mobile device and providing that image to a depository. And Chinese Patent Application

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Publication No. CN 1897644A to "Luo" discloses a "method and system" of a "handheld" device for determining that a "preview image" "is clearer and more accurate" for performing "optical character recognition ... with high accuracy" by monitoring whether the edge of a document is "substantially parallel" to a "reference line" displayed on a preview screen of the system. EX1004, 7.1 When this monitoring criterion is met, "instructions" are provided to the user "before capturing the image of the object." Further, Acharya is compatible with the implementation of Luo's technique for image capture, and it would have been obvious to do so.

The grounds advanced in this Petition are distinguishable over the grounds presented in IPR2019-01082, a prior IPR challenge to the '571 patent by an unrelated party. Wells Fargo Bank, N.A. v. United Services Automobile Association, IPR2019-01082, Paper 41 (P.T.A.B. Nov. 24, 2020). There, the Board rejected the proffered combination of references because they offered competing technical solutions for obtaining suitable images for optical character recognition. *Id.*, 14, 24-28. As shown below, this Petition addresses the independent claims using a different set of prior art references that complement rather than conflict with one another.

¹ Page number citations to EX1004 refer to the page numbers of the Description section in the English translation, starting on page 4 of EX1004.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

In view of these references and the additional prior art discussed below, PNC request that claims 1-6, 9, 10, 12, and 13 be cancelled in this *inter partes review* ("IPR") Petition.

II. MANDATORY NOTICES

A. Real Party-In-Interest

Pursuant to 37 C.F.R. §42.8(b)(1), Petitioner certifies that PNC Bank, N.A. is the real party-in-interest.

B. Related Matters

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioner states that Patent Owner ("PO") has asserted four patents, including the '571 patent, in *United Services Automobile Association v. PNC Bank N.A.*, No. 2:20-cv-00319-JRG (E.D. Tex.) (the "-00319 Action"). PO has asserted two additional patents in *United Services Automobile Association v. PNC Bank N.A.*, No. 2:21-cv-00110-JRG (E.D. Tex.).

In the -00319 Action, Petitioner has asserted counterclaims against PO, asserting two patents: U.S. Patent Nos. 8,682,754 and 8,868,786. PO has filed an IPR petition challenging validity of U.S. Patent No. 8,868,786. *United Services Automobile Association v. PNC Bank, N.A.*, IPR2021-01163. Seven prior post-grant proceedings have been filed pertaining to patents in the '571 patent's family:

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Challenged Patent	Case Nos.
U.S. 8,977,571	CBM2019-00004
	IPR2019-01082
	IPR2020-00975
U.S. 9,818,090	CBM2019-00002
	IPR2019-00815
	IPR2020-00882
U.S. 9,569,756	IPR2020-00092

Petitioner is concurrently filing a petition for *inter partes* review (IPR2021-01070) challenging claims of U.S. Patent No. 8,699,779 asserted against Petitioner in the -00319 Action.

C. Counsel

Under 37 C.F.R. § 42.8(b)(3)-(4), Petitioner identifies the following lead and backup counsel, to whom all correspondence should be directed.

Lead Counsel: Monica Grewal (Reg. No. 40,056)

Backup Counsel: David Cavanaugh (Reg. No. 36,476)

Gregory Lantier (pro hac vice to be filed)

Taeg Sang Cho (Reg. No. 69,618)

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Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

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Petitioner consents to service by e-mail on lead and backup counsel.

III. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies under 37 C.F.R. § 42.104(a) that the patent for which review is sought is available for *inter partes* review (IPR) and under 37 C.F.R. § 42.101(a)-(c) that Petitioner is not barred or estopped from requesting an IPR challenging the patent claims on the grounds identified in this Petition.

IV. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Pursuant to Rules 42.22(a)(1) and 42.104(b)(1)-(2), Petitioner challenges claims 1-6, 9, 10, 12, and 13 of the '571 patent.

A. Prior Art Patents and Printed Publications

The following references are pertinent to the grounds of unpatentability

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

explained below:²

• U.S. Patent No. 8,768,836 (EX1003, "Acharya"), filed August 7, 2007, is prior art under 35 U.S.C. § 102(e).

- Chinese Patent Application Publication No. CN 1897644A (EX1004, "Luo"), published January 17, 2007, is prior art under 35 U.S.C. §§ 102(a),(b).
- U.S. Patent Application Publication No. 2007/0262148 (EX1005, "Yoon"), published on November 15, 2007, is prior art under 35 U.S.C. §§ 102(a),(b).
- U.S. Patent Application Publication No. 2009/0185241 (EX1016, "Nepomniachtchi"), filed December 30, 2008, published July 23, 2009, claims priority to U.S. Provisional Application No. 61/022,279 (EX1033, "Nepomniachtchi Provisional"), filed January 18, 2008. Thus, Nepomniachtchi is prior art under §§ 102(a),(e).

Acharya, Luo, and Yoon are not of record on the face of the '571 patent.

Nepomniachtchi is of record on the face of the '571 patent but did not form the basis of a rejection during prosecution. Nepomniachtchi and Yoon were used in IPR

² For purposes of this petition, the effective filing date of the '571 patent is August 21, 2009, which is before the effective date of the "First-Inventor-to-File" provisions of the America Invents Act (AIA). Accordingly, Petitioner applies the pre-AIA statutory framework.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

petitions filed by third parties. In the present Petition, *Nepomniachtchi* and *Yoon* are used separately, in combination with other references that had not been considered by the Board and thus present new grounds of invalidity. EX1002, ¶¶49,53,61,68.

1. Nepomniachtchi is Entitled to its Provisional Filing Date

Under pre-AIA 35 U.S.C. §102(e), *Nepomniachtchi* qualifies as prior art as of its filing date. It also separately qualifies as §102(e) prior art as of the filing of the provisional application to which it claims priority. For purposes of §102(e), a published patent application is entitled to the filing date of a beneficially claimed provisional application as an effective prior art date, provided that 1) the subject matter relied upon in the application is described in the provisional application; and 2) at least one of the claims in the application is supported by the provisional application. *Amgen Inc. v. Sanofi*, 872 F.3d 1367, 1380 (Fed. Cir. 2017); M.P.E.P. § 2136.03. EX1002, ¶66.

The citations in the table below show that the subject matter relied upon in *Nepomniachtchi* is described in *Nepomniachtchi Provisional*. EX1002, ¶67.

Nepomniachtchi (EX1016)	Nepomniachtchi Provisional (EX1033)
Title	[0005]
[0053]	[0020]
[0054]	[0021]
[0056]	[0023]
[0058]	[0025]

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Nepomniachtchi (EX1016)	Nepomniachtchi Provisional (EX1033)
[0062]	[0029]
[0078]	[0045]

In addition, the citations shown below demonstrate that at least claim 1 of *Nepomniachtchi* is supported by *Nepomniachtchi Provisional*. EX1002, ¶67.

Nepomniachtchi, Claim 1 (EX1016)	Nepomniachtchi Provisional (EX1033)
1. A mobile image capture and processing system for documents, comprising:	[0001], [0004], [0005], [0020], Claim 11
a mobile communication device including:	Claim 11, [0004]
a processor configured to read instructions;	Claim 11
a memory coupled to the processor and configured to store the instructions;	Claim 11
an image capturing device coupled to the processor and configured to capture an image of a document;	Claim 11
a transmitter configured to transmit the image to a server; and	Claim 11
a server configured to process the image to create a bi-tonal image of the document for data extraction.	Claim 11, [0005]

Accordingly, for purposes of 35 U.S.C. §102(e), *Nepomniachtchi* is entitled to an effective priority date of January 18, 2008, the filing date of *Nepomniachtchi Provisional*.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

B. Grounds of Challenge

Petitioner requests cancellation of challenged claims 1-6, 9, 10, 12, and 13 of the '571 patent as unpatentable under 35 U.S.C. § 103 on the following grounds:

Ground	References	Basis	Claims Challenged
I	Acharya and Luo	§ 103	1-3, 6, 9, 10, 13
II	Acharya, Luo, and Nepomniachtchi	§ 103	4, 5
III	Acharya, Luo, and Yoon	§ 103	12

This Petition, supported by the declaration of Dr. Todd Mowry (EX1002), demonstrates that there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. 35 U.S.C. §314(a). Petitioner respectfully requests institution. *SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348, 1351 (2018).

V. TECHNICAL BACKGROUND

A. Remote Check Deposit using Mobile Devices

Traditional check deposit and clearing required the payee bank to send a paper check to the payor bank. EX1009, 1:26-53. In 2004, the Check 21 Act ("Check 21") changed this by allowing payee banks (also known as "banks of first deposit") to image incoming checks and process them as electronic documents. This new paradigm enabled payee banks to transmit digital images of the front and back of the original check in place of physical checks. EX1002, ¶28.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

After Check 21, "the use of digital images for check presentment ... reduce[d] the time necessary for a check to clear and the cost associated with moving paper checks from location to location." EX1010, 1:31-36. Banks began to enable customers to deposit paper checks by submitting photographs of checks, taken with mobile devices such as camera phones. For example, by January 2008, Mitek Systems had launched a product called ImageNet Mobile Deposit, "a remote check capture product for the mobile phone" that "us[es] the increasingly powerful cameras built into most mobile phones." EX1008, 1. This product enabled check images captured with a camera phone to be used in a Check 21-compliant check deposit process without the need to deposit a physical check in which "[t]he user enters the amount of the check being deposited and instructs the person to snap a picture of the front and then the back of the check. Immediate feedback is given with regard to quality" and "[i]f the check looks good, the person simply clicks the 'submit' button." Id. EX1002, ¶¶28,29.

As shown in the figure below, ImageNet Mobile Deposit enabled a person to deposit a check remotely using their camera phone:

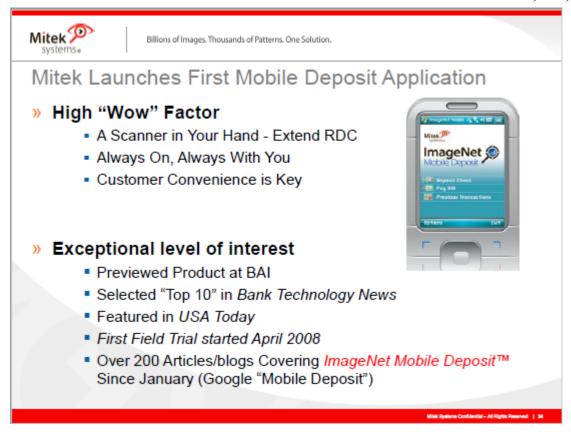
Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



EX1014, 37. EX1002, ¶30.

By June 2008, ImageNet Mobile Deposit was already known in the industry as a remote deposit solution, and was a "Top 10" selection in the banking industry news:

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



Id. EX1002, ¶30.

B. <u>Image Monitoring and Capture</u>

Well before the '571 patent, "camera captured images" were known to "suffer from low resolution, blur, and perspective distortion, as well as complex layout and interaction of the content and background." EX1029, Abstract. In particular, unaided use of handheld mobile devices to capture document images, including but not limited to checks, was known to reduce alignment precision compared to previous scanning devices. EX1015, [0020]-[0023] ("The popularity of mobile imaging devices such as camera phones" for "document scanning" results in "raw images of documents" that "are typically not useful ... due primarily to ... imaging

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

angles ... [and] optical effects [that] ... include: variable lighting conditions, [and] shadowing."). *See also* EX1029, 4. EX1002, ¶31.

It was also well known that these same considerations applied equally to check imaging. EX1015, [0072]; EX1016, [0058] ("Optical defects, such as out-of-focus images (as discussed above), unequal contrast or brightness, or other optical defects, might make it difficult to process an image of a document (e.g., a check, payment coupon, deposit slip, etc.)"). EX1002, ¶32.

Solutions to these problems had already been developed by technology companies, first for digital cameras and subsequently for camera phones. For example, Japanese Patent Application Publication No. 2004-23158 ("Takehara") recognized that "the accuracy of recognition diminishes in cases where the luminosity of an image is either too low or too high to an extreme level." EX1025, [0058]. To address this, Takehara taught a digital camera that calculated an "assessment of the state of an image" to determine whether it was suitable including calculating the "brightness (luminosity) of an image" based on pixel values in the digital image. *Id.*, [0055]-[0056]. The LG VX9800 smartphone (released in 2005) had business card reader software that provided "focus" and "angle" feedback so that the user could adjust the camera and "take a clear picture" suitable for optical character recognition of "information such as name, phone number" etc.:

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

2.9 Name Card Reader* (* Shown only on the inner LCD Screen.)

You can take a picture of a name card using the camera function to directly store and edit the image with information such as name, phone number, mobile phone number, E-mail address and fax number in Contact.



EX1019, 60-61. EX1002, ¶33.

Similarly, the Motorola GSM wireless phone was equipped with a business card reader application that provided "instruction on how to position and frame the business card that you want to capture" and "automatically capture[d] a business card when the card is properly framed":

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Camera Mode Switch

→ = normal picture mode.

= macro mode.

business card reader

The business card reader application lets you use your phone's camera to capture a business card image, then store the card's information as a contact in the phone's electronic address book.

capture business card image

Tap SCR in the application launcher screen to open the business card reader application.

Tip: Tap Help to see instructions on how to position and frame the business card that you want to capture.



Push the camera mode switch to the **left** to put the camera lens in macro mode.

Tap Capture Business Card to activate the camera and go to the Optical

Character

Recognition (OCR) viewfinder.

Use the red border in the OCR viewfinder to vertically frame the business card you want to capture. Position the camera so that the card fills the frame without extending beyond the frame borders. The framing border and center indicator turn green when the business card is framed properly.

Your phone automatically captures a business card image when the card is properly framed

EX1020, 93 (annotated with text highlighted in yellow). EX1002, ¶33.

With these techniques already in use on camera phones, the task of capturing better check images was simply a matter of implementing widely known techniques for that purpose. EX1002, ¶34.

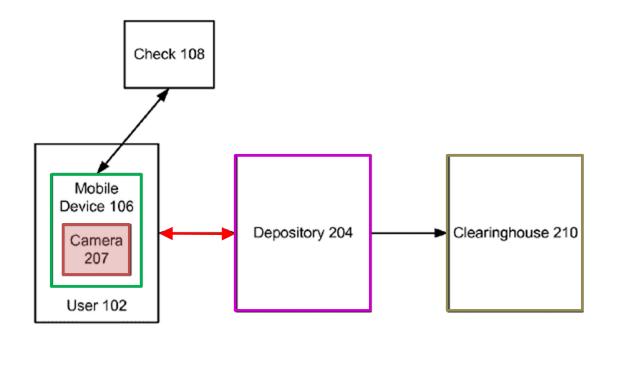
VI. THE '571 PATENT

A. Overview

As shown in Figure 2 (reproduced below), the '571 patent is generally directed to "remote deposit of checks" wherein "the payee may capture a digital image of a

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

check using a [camera on a] mobile device³. The financial institution [i.e., depository] may then receive from the payee the digital image of the check. The financial institution may then use the digital image to credit funds to the payee" via a clearinghouse in compliance with Check 21. EX1001, 1:26-30, 12:17-23.



<u>FIG. 2</u>

200

Id., FIG. 2. EX1002, ¶35.

³ All color annotations and emphases in this petition have been added unless noted otherwise.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

To implement this process, it is desirable to capture an image of a check with "high enough quality for subsequent processing" (EX1001, 3:63-64) so that "the account number, amount payable, and the like may be readable such that it may be parsed or otherwise obtained and processed by the financial institution to credit an account 160 associated with the user [payee] 102 and debit an account associated with the payor." *Id.*, 4:64-67. According to the '571 patent, however, "[c]apturing a digital image at a mobile device that allows for subsequent detection and extraction of the information from the digital image is difficult." *Id.*, 1:31-35. EX1002, ¶36.

The '571 patent purports to improve image capture in a mobile device using monitoring criteria. More specifically, the alleged invention involves: (1) "monitoring" "[a]n image of a check that is in the field of view of a camera" of a mobile device; (2) providing "feedback" to the "user of the camera regarding the image of the check"; and (3) "[w]hen the image of the check in the field of view passes *monitoring criteria*, [taking] an image ... by the camera and provid[ing] [the image] to a financial institution." EX1001, 1:38-53. *See also id.*, 3:45-48. These steps are shown in 830-860 in Figure 8, reproduced below.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

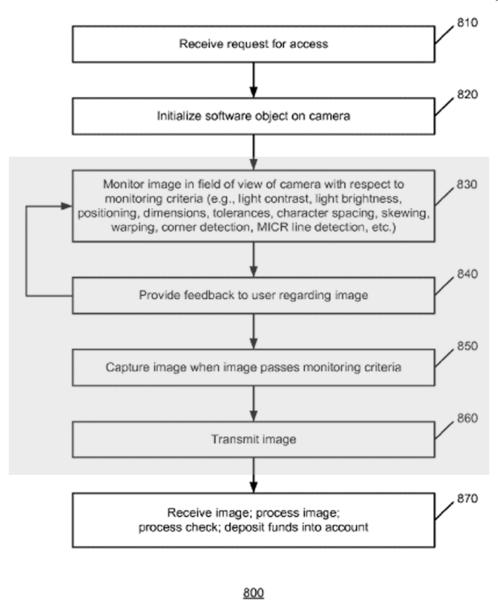


FIG. 8

Id., FIG. 8. EX1002, ¶37.

The monitoring criteria indicate the suitability of the image to represent the check using features such as "one or more of light contrast on the image, light brightness of the image, positioning of the image, dimensions, tolerances, character

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

spacing, skewing, warping, corner detection, and MICR (magnetic ink character recognition) line detection" EX1001, 4:3-7. For example, "[o]ne of the monitoring criteria may be based on the positioning of the check 180 in the image 230" (*id.*, 7:29-30) which "may be compared with an alignment guide...." *Id.*, 7:39. "The alignment guide may be overlaid on the camera feed of the mobile device" (*id.*, 58-59) and "may take any shape such as a bounding rectangle or other bounding box or shape, horizontal and/or vertical bars, parallel lines, etc., for example." *Id.*, 7:60-62. Moreover, "feedback may be generated and provided to the user 102 regarding this monitoring criterion with instructions for moving the check 108 or the camera 207 in order to properly align the check 108 in the field of view." *Id.*, 7:67-8:3. EX1002, ¶38.

As explained above in Section V, monitoring criteria such as "light brightness of the image, positioning of the image," and "skewing" have been used in the prior art to monitor certain documents in anticipation of optical character recognition. The '571 patent does not disclose or suggest any techniques or algorithms specific to check images. EX1002, ¶39.

B. Prosecution History

The application for the '571 patent was filed on August 21, 2009 and the '571 patent issued on March 10, 2015. EX1001, cover. Following the examiner's initial search results and initial rejection of the filed claims, applicant submitted a

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

supplemental Information Disclosure Statement ("IDS") with its response containing over 450 references. EX1007, 140-143. After allowance, applicant requested continued examination and filed another supplemental IDS containing over 475 references. *Id.*, 287-300. EX1002, ¶40.

C. Conception and Reduction to Practice

USAA allegedly "conceived the invention of the '571 patent no later than July 1, 2008 and worked diligently reducing it to practice at least through the effective filing date of the '571 patent (August 21, 2009)." *Mitek Sys. Inc. v. United Services Automobile Association*, IPR2020-00975, Paper 20, 33 (P.T.A.B. Aug. 29, 2020). *Acharya* and *Luo* predate the alleged conception date. EX1002, ¶48,53.

VII. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art ("POSITA") on the alleged conception date of the '571 patent (July 1, 2008) and at the time of the filing date of the '571 patent (August 21, 2009) would have had a bachelor's degree in electrical engineering, computer science, computer engineering, or equivalent field, and at least two years of prior experience with image processing or scanning technology involving transferring and processing of image data to and at a server. A person with additional education or additional industrial experience could still be of

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

ordinary skill in the art if that additional aspect compensates for a deficit in one of the other aspects of the requirements stated above. EX1002, ¶41.

VIII. CLAIM CONSTRUCTION

The Board need only construe claim terms to the extent necessary to resolve a controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

In the co-pending district court litigation, Petitioner and PO agree on the construction of certain terms and disagree on others. *See* EX1023, 5-6, 10-11. In this petition, Petitioner relies on the constructions urged by PO in the co-pending district court litigation or as the parties agreed, except for the limitation "feedback ... regarding the image of the check with respect to the monitoring criterion." Rule 42.104(b)(3) "does not require Petitioner to express its subjective agreement regarding correctness of its proffered claim constructions or to take ownership of those constructions." *Western Digital Corp. v. SPEX Techs. Inc.*, IPR2018-00084, Paper 14, 11-12 (P.T.A.B. Apr. 25, 2018). Other claim terms are given their plain and customary meaning as understood by a POSITA, in accordance with *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). EX1002, ¶¶42-44.

More specifically, the table below lists the proposed constructions of terms for this petition.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Term	Proposed Construction ⁴	Intrinsic Support ⁵
"monitoring criterion"	* "one or more features	EX1001, claims 1, 9, 12,
momenting criterion	of a check image that	13, 15, 1:40-43, 3:54-58,
(claims 1-4, 6, 9, 10, 12,	provide information	3:61-64, 4:3-8, 7:41-57,
13)	about the suitability of	8:40-45, 13:38-40, 14:11-
	the image to represent the	17, 16:5-13, Fig. 8.
	check"	
"depositing a check"	* "providing a check to a	EX1001, 1:13-33, 3:8-10,
	depository in a form	3:39-45, 6:29-41, 15:10-
(claims 1, 9)	sufficient to allow money	12, 17:13-15, Figs. 8-9.
	to be credited to an	
	account"	
"a non-transitory	# Preamble is limiting	EX1001, claims 1, 9,
computer-readable		2:23-28, 3:9-12, 3:37-53,
medium comprising		3:53-61, 4:17-22, 7:52-
[computer-readable]		57, 12:19-25, 15:43-49,
instructions for		16:51-54, 18:2-6 and
depositing a check"		Figs. 8-9.
(1: 10)		CD1/2010 00004 B
(claims 1, 9)		CBM2019-00004, Paper
		22, 10-14 (P.T.A.B. May
(4 1 1 1 1 2	11.66	15, 2019).
"mobile device"	# "computing device	EX1001, 3:48-53, 5:45-
(1: 1.2.7.10)	capable of being easily	48, 6:3-17, 11:16-20,
(claims 1, 2, 7-10)	moved and that is	12:31-33, 13:1-6, 15:13-
	controlled by a mobile	17
	operating system"	

⁴ "*" denotes an agreed-upon construction. "#" denotes the construction proposed by PO in the district court.

⁵ For the construction proposed by PO in the district court, this column provides the intrinsic support cited by PO. For agreed-upon constructions, this column provides the Petitioner's intrinsic support.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

D 1 G 1 A 1 A 1 G 1 A 1 G 1 A 1 G 1 A 1 G 1 A 1 G 1 A 1 G 1 A 1 G 1 A 1 A		
Term	Proposed Construction ⁴	Intrinsic Support ⁵
"passes the monitoring	# "determining that the	EX1001, 3:54-64, 4:17-
criterion"	quality of the monitored	22, 4:61-5:6, 7:52-57,
	image feature is within	8:45-54, 10:6-13, 12:9-
(claims 1, 4, 6, 9, 10)	acceptable thresholds so	25, 13:34-44, 15:43-49
	that check data can be	and Fig. 8.
	electronically obtained	
	from the image without	CBM2019-00004,
	error during electronic	Paper 22, 14-17
	processing and clearing"	(P.T.A.B. May 15, 2019).
"when the image of the	# "at or after the moment	EX1001, 3:54-4:8, 5:45-
check [in the field of	the image of the check	61, 6:13-22, and Fig. 8.
view] passes the	[in the field of view]	
monitoring criterion"	passes the monitoring	CBM2019-00004,
	criterion"	Paper 22, 14-17
(claims 1, 6, 9, 10)		(P.T.A.B. May 15, 2019).
"feedback regarding	No further construction	EX1001, claim 2, 10, 11,
the image of the check	necessary.	1:51-56, 4:22-26, 7:26-
with respect to the		28.
monitoring criterion"		
		See Section VIII.A.
(claim 2)		
"image monitoring and	# Not subject to § 112(6)	EX1001, 2:20-28, 12:55-
capture module"6	and not indefinite. No	64, 12:64-13:19, 13:34-
	further construction	44, 15:30-33, and Figs. 2,
(claims 1, 9)	necessary.	7-9.
"capture the image of the	# No further construction	EX1001, 5:45-61, 6:13-
check [with / using] the	necessary.	17, 11:33-36, 15:23-33,
camera"		15:34-49, 15:61-16:10,
		and Fig. 8.
(claims 1, 9)		

⁶ In the co-pending district court litigation, Petitioner contends that "image monitoring and capture module" is subject to § 112(6), and indefinite for lack of corresponding structure. EX1023, 4.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Term	Proposed Construction ⁴	Intrinsic Support ⁵
"instructions that provide feedback / feedback / feedback comprises instructions" (claims 2-5, 10)	# No further construction necessary. Terms have patentable weight.	EX1001, Abstract, 1:51-56, 4:17-26, 6:17-22, 7:13-21, 7:65-8:3, 8:16-20, 8:25-34, 8:49-54, 9:4-12, 9:15-24, 9:39-43, 10:53-59, 15:50-60, and Figs. 3, 8.
		IPR2019-00815, Paper 17, 17-18 (P.T.A.B. August 26, 2019).

EX1023, 5-6, 10-11. EX1002, ¶45.

A. <u>"feedback ... regarding the image of the check with respect to the monitoring criterion"</u>

For the limitation "feedback ... regarding the image of the check with respect to the monitoring criterion" in claim 2, Petitioner adopts the plain and ordinary meaning as opposed to PO's proposed construction in the co-pending litigation: "instructions to the user regarding actions to take in order to satisfy one or more monitoring criteria based on analysis of the monitoring criteria by the system." The plain and ordinary meaning is the same construction adopted by the district court in a prior litigation involving the '571 patent. *See* Claim Construction Memorandum Opinion and Order, *United Services Automobile Association v. Wells Fargo Bank, N.A.*, No. 2:18-cv-00245 (E.D.Tex), Dkt. No. 100 ("EX1024"), 37-39. In that prior litigation, the district court rejected PO's construction—the construction also

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

advanced in the co-pending litigation against Petitioner—holding that "[i]n the context of the surrounding claim language [of claim 2], the meaning of 'feedback' ... is clear without construction." *Id.*, 39. The district court explained that the meaning of "feedback" is broader than PO's narrow construction: "the ['571] patent[] expressly contemplate[s]—and claim[s] [in claim 11]—feedback that is **other than** 'instructions to the user regarding **actions to take in order to satisfy one or more monitoring criteria** based on analysis of the monitoring criteria by the system." *Id.* EX1002, ¶46.

The district court's reasoning is equally applicable here. The '571 patent makes clear that "feedback... regarding the image of the check with respect to the monitoring criterion" can be other than "instructions to the user regarding actions to take in order to satisfy one or more monitoring criteria," including "advising the user" "when the image 230 passes the one or more monitoring criteria" and "to capture the image of the check 108." EX1001, 7:26-28. See also id., 1:51-56; 4:22-26. Indeed, claim 11 of the '571 patent expressly claims that "the feedback comprises instructions to the user to *capture the image of the check*." PO's proposed construction improperly reads out that embodiment of the '571 patent. EX1002, ¶47.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

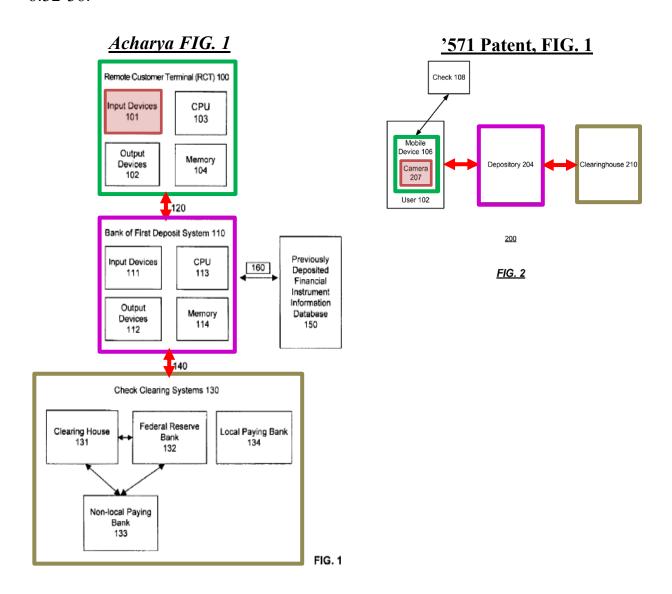
IX. OVERVIEW OF PRIOR ART

A. Acharya

Like the '571 patent, *Acharya* is generally directed to "a deposit transaction" of "a financial instrument, such as a paper check" initiated by "a banking customer located at a remote location" using a "Remote Customer Terminal (RCT)" "connected to a bank system." EX1003, Abstract. Using the Remote Customer Terminal, "the banking customer captures the digital image of the financial instrument by ... the digital camera" *Id.*, 3:11-13. The "image and/or other data of the financial instrument are transmitted from the RCT to the Bank of First Deposit (BOFD) where the data may be processed." *Id.*, Abstract. In addition, "the BOFD system 110 may be connected to one or more check clearing systems 130 via a communication link 140. The check clearing systems may comprise for-profit

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

clearing houses 131, Federal Reserve banks 132, and local paying banks 134." *Id.*, 6:32-36.



Id., FIG. 1 and EX1001, FIG. 2. EX1002, ¶51.

Like the '571 patent, *Acharya*'s Remote Customer Terminal (RCT) may be a "cell phone, PDA or any other computer, apparatus, wireless handheld device" (EX1003, 4:18-20) that includes "a digital camera." *Id.*, 4:37. Moreover, like the '571 patent, *Acharya*'s digital images are processed to extract data such as "MICR

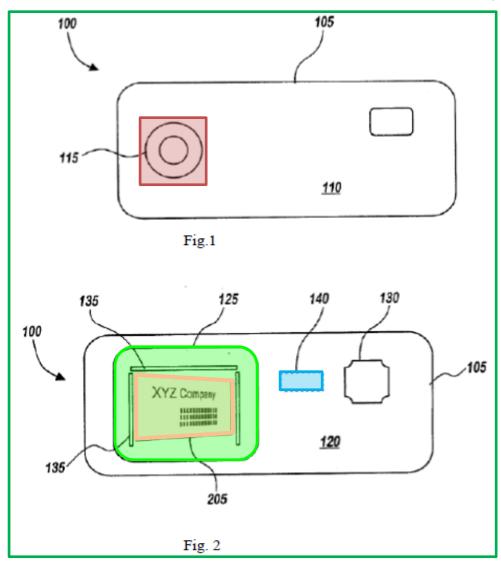
Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

line, RTN, account number, amount of financial instrument, [and] date of financial instrument" *Id.*, 2:53-55. Thus, *Acharya* is analogous art to the '571 patent because it is both "from the same field of endeavor ... and ... reasonably pertinent to the particular problem with which the inventor is involved." *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). EX1002, ¶52.

B. *Luo*

Like *Acharya* and the '571 patent, *Luo* is directed to "digital cameras in a variety of handheld electronic devices" including "mobile phones" and "personal digital assistants (PDAs)." EX1004, 1. For example, *Luo* depicts a **handheld camera system** 100 including an "**image sensor** 115 adapted to receive an image" and a "preview window 125" that functions as a "viewfinder" that "display[s] in real time any moving **image** of the scene in front of the **image sensor** 115." *Id.*, 3.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



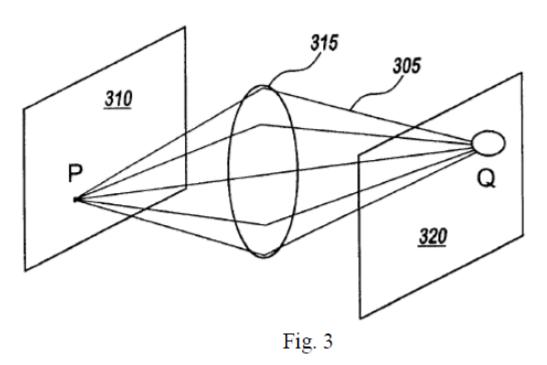
Id., FIGS. 1 and 2. EX1002, ¶54.

Like the '571 patent, *Luo* discloses techniques to improve image capture using such handheld devices to obtain "well-focused and clear document images" to "make the optical character recognition of any text printed in the document effective and reliable." EX1004, 4. *Luo* recognizes that images captured using handheld devices may result in "unideal variable factors such as the distance from the lens" to

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

yield images that "may contain defects such as projective distortion" which impair optical character recognition on the document. *Id.*, 1. EX1002, ¶55.

For example, as illustrated in *Luo*'s Figure 3, "projective deformation" occurs when the "the surface of the object to be imaged" (also called the "object plane 310") and the "preview image displayed in window 125" (forming the "image plane 320") are not "substantially parallel," resulting in "the shape in the region 'p' on the object plane" being "enlarged by the lens 315 and distorted into a region 'Q' of a different shape on the image plane." EX1004, 4.



Id., FIG. 3. EX1002, ¶56.

As illustrated in *Luo*'s Figure 5, such projective deformation (used interchangeably with the term "projective distortion" in *Luo*) causes portions of the document to be "blurred and difficult to read because the surface of the business card

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

is tilted in relative to the image plane 320 of the system 100" and that, "[a]s known to those skilled in the art, the limited depth of field and projective distortion of the camera system 100 make the right side of the image blurry." EX1004, 5. Accordingly, the projective distortion can degrade the performance of subsequent image processing steps, such as OCR. *Id.*, 1.

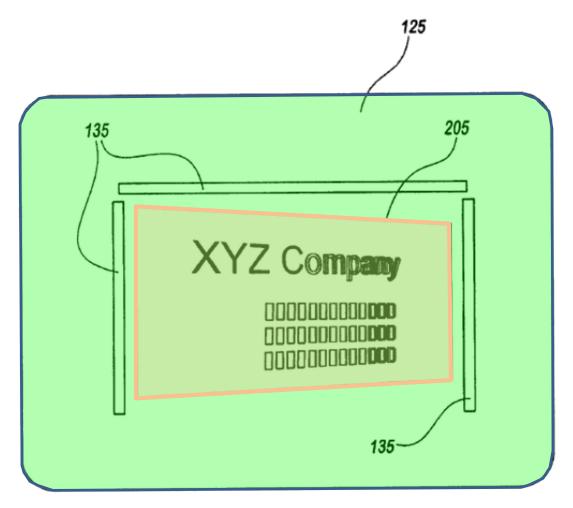


Fig. 5

Id., FIG. 5. EX1002, ¶57.

Luo addresses these problems using "reference lines." Luo's "reference lines" work the same way as the '571 patent's "alignment guide":

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

| Name | Date | Street | City, State | Samount | Pay to the order of | Dollars | Dollars | MICR line | Date | Date

FIG. 3

EX1004, FIG. 5; EX1001, FIG. 3.

Fig. 5

For example, *Luo* teaches that "projective distortion in the image is reduced" by monitoring the document image 205 relative to reference lines 135 and allowing "the image of the object to be captured" "only when the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135." EX1004, 7. EX1002, ¶58-59.

Luo's teaching is applicable to a wide variety of documents, including "rectangular, triangular, or other shaped pieces of paper, such as business cards, or other objects having straight edges 205 and a surface." EX1004, 6. Accordingly, a POSITA would have readily recognized that Luo contemplates using its techniques

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

to image a paper check. Thus, *Luo* is analogous art to the '571 patent. *In re Bigio*, 381 F.3d at 1325. EX1002, ¶60.

X. SPECIFIC GROUNDS FOR UNPATENTABILITY

Pursuant to Rule 42.104(b)(4)-(5), the following sections (as confirmed in Dr. Mowry's Declaration ¶¶71-165 (EX1002)) detail the grounds of unpatentability, the limitations of challenged claims 1-6, 9, 10, 12, and 13 of the '571 patent, and how these claims were therefore obvious in view of the prior art.

A. Ground I: Claims 1-3, 6, 9, 10, and 13 Would Have Been Obvious Over *Acharya* In View of *Luo*

1. Combination of Acharya and Luo ("Acharya/Luo")

Acharya discloses that "the banking customer captures the digital image of the financial instrument by ... the digital camera" from an "RCT" (Remote Consumer Terminal) such as a "wireless handheld device" with a "digital camera" "when prompted or prior to accessing the BOFD system." EX1003, 3:1-14. The captured images are check images suitable for extracting data such as "MICR line, RTN, account number, amount of financial instrument, [and] date of financial instrument." *Id.*, 2:53-55. EX1002, ¶¶72-73.

Acharya does not expressly disclose details of how its system determines that an image is suitable for capture or how to implement the customer prompt for capturing such an image. Accordingly, a POSITA would have been motivated to

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

find teachings from the prior art to fill these implementation details. EX1002, ¶¶73-74.

A POSITA would have readily recognized that *Luo* provides such teachings. Luo discloses a "method and system" for determining that an "image is clearer and more accurate" for performing "optical character recognition ... with high accuracy" by monitoring whether "the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135." EX1004, 7. After this monitoring criterion is met, "instructions" are provided to the user "before capturing the image of the object." Id., claims 5, 11. Luo further discloses implementation details, including feedback that indicates "to the user that an appropriate number of reference lines 135 are substantially parallel to the respective straight edges 205 of the object depicted in the preview window 125," including: "an alarm," "light illuminated in the preview window 125," and "an image indicator." Id., 6. Luo teaches that its embodiments "may consist of one or more conventional processors and uniquely stored program instructions" and that "such software instructions and programs and ICs" "control the operation of one or more processors." *Id.*, 8. EX1002, ¶¶74-75.

A POSITA would have been motivated to incorporate *Luo*'s teachings into *Acharya*. *Luo* explains that "many environments" "for using digital cameras are not ideal for capturing high-quality images" resulting in "defects such as projective

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

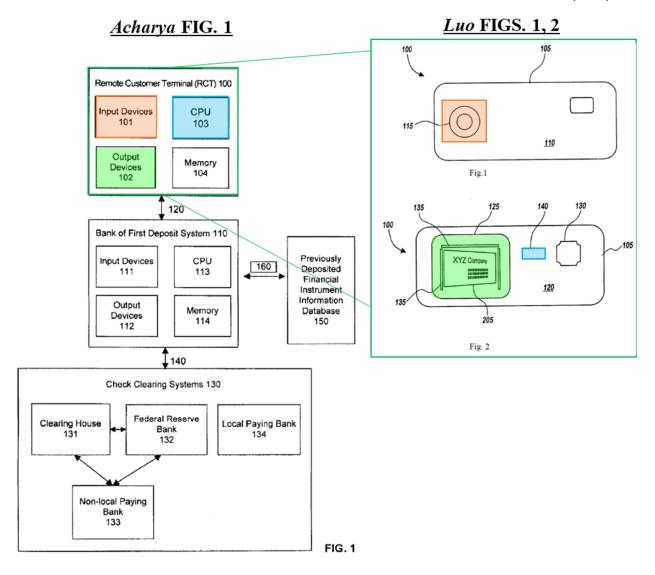
distortion." EX1004, 1. Given these difficulties with using handheld devices, Luo provides a motivation to modify Acharya to implement the teachings of Acharya using the monitoring, feedback, and capture techniques described in *Luo* to improve captured images. Luo specifically teaches reducing blur in a captured "business card image" by guiding the user to capture the card image "substantially parallel to the image plane 320 of the camera system 100." Id., 5. A POSITA would have understood that such a guidance feature enables "an optical character recognition process performed on a [captured] text image, with high accuracy." Id., 7. In addition, a POSITA would have understood that Luo's feedback to the customer described above assists the user in capturing images. A POSITA would have recognized that these techniques were directly applicable to check image capture to predictably increase the likelihood of obtaining images suitable for "convert[ing] machine printed characters on ... the digital image of the financial instrument to electronic text." EX1003, 4:67-5:2. EX1002, ¶¶76-77.

As illustrated below, implementing *Acharya*'s RCT using *Luo*'s camera system would have amounted to "[a]pplying] a known technique to a known device ready for improvement to yield predictable results." M.P.E.P. § 2141. In the *Acharya/Luo* combination, the **Remote Customer Terminal** 100—"a telephone, **digital camera, ... PDA or ... wireless handheld device**" (EX1003, 4:18-20; 3:1-5)—is implemented as *Luo*'s **Camera System** 100. As shown in Figures 1 and 2 of

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Luo, Luo's Camera System 100 is "a handheld electronic device," so it is "capable of being easily moved." EX1004, 1. Luo's Camera System 100 includes an image sensor 115 (i.e., "camera"), a preview window 125 (i.e., "display"), and a **Processor** 140 (i.e., "processor"). *Id.*, 8. The preview window 125 is a "display" because *Luo* teaches that the **preview window** "is suitable for **displaying** the image received by the image sensor 115" and "can function as a viewfinder of a conventional camera and display in real time any moving image of the scene in front of the image sensor 115." Id., 3. Further, Acharya's Input Devices 101 is implemented as Luo's Image Sensor 115 (camera), and the CPU 103 is implemented as Luo's Processor 140. Acharya's Output Devices 102 "compris[ing] a speaker, a display unit, a paper printer, or any other output device that can communicate a message to a human or a machine" (EX1003, 4:48-50) is implemented as the output devices of *Luo*'s **mobile phones** including, for example, Luo's preview window 125 (EX1004, 3). In addition, Acharya's Memory 104 is implemented as *Luo*'s system 100's **memory**. EX1002, ¶¶78-80.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



EX1003, Figure 1 (schematic diagram of the system) and EX1004, FIGS. 1 and 2 (views of camera system). EX1002, ¶80.

A POSITA would have had a reasonable expectation of success in implementing *Acharya*'s RCT using *Luo*'s camera system. *Acharya* teaches that "[c]ertain instructions may also be stored in RCT memory 104 and executed by the CPU 103, for example, to assist in communication and data collection functions." EX1003, 4:63-65. Similarly, *Luo* teaches that "the embodiments described herein

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

may consist of one or more conventional processors and uniquely stored program instructions that control the operation of one or more processors" and that "it is hoped that technicians will be able to easily generate such software instructions and programs and ICs with minimal experimentation under the guidance of the principles and principles disclosed herein" EX1004, 8. Moreover, "[t]hose skilled in the art should realize that the miniaturized digital camera technology enables the camera housing 105, the image sensor 115, and the preview window 125 to be almost any size, so the embodiments of the present invention can be incorporated into various electronic devices, such as mobile phones, personal digital assistants, and laptops." Id., 6. Thus, a POSITA would have recognized that the implementation details taught by Luo would apply to Acharya's "telephone, digital camera, ... PDA or ... wireless handheld device" RCT (EX1003, 4:18-20) as instructions (i.e., software) stored in memory and executed by the CPU 103. EX1002, ¶81.

A POSITA would have had more reasons to have a reasonable expectation of success in combining *Acharya* and *Luo*. The techniques of both references are implemented on the same kinds of handheld devices. For example, *Acharya*'s "RCT" (Remote Customer Terminal) for image capture may be a "cell phone, PDA or any other computer, apparatus, wireless handheld device" (EX1003, 4:18-20) that includes "a digital camera" (*id.*, 4:37). Similarly, *Luo*'s technique is applicable for

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

"digital cameras in a variety of handheld electronic devices" including "mobile phones" and "personal digital assistants (PDAs)." EX1004, 1. EX1002, ¶82.

Moreover, teachings of *Acharya* and *Luo* are directed to similar types of documents, and *Luo*'s disclosure is both broad enough to include and descriptive of key features of the "financial instrument, e.g. a paper check" disclosed by *Acharya*. EX1003, 1:21-22. *Luo* is directed to "documents" (EX1004, 1) including "rectangular, triangular, or other shaped pieces of paper ... or other objects having straight edges 205 and a surface" (*id.*, 6) to "make the optical character recognition of any text printed in the document effective and reliable." *Id.*, 4. A POSITA would have recognized that *Luo*'s technique can be applied to obtain paper check images suitable for optical character recognition with a reasonable expectation of success. EX1002, ¶83.

Accordingly, it would have been obvious for a POSITA to combine the teachings of *Acharya* with *Luo* to incorporate into *Acharya Luo*'s teachings regarding monitoring, monitoring criterion, capturing the image when the image passes the monitoring criterion, feedback to a user, and a software object. EX1002, ¶84.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

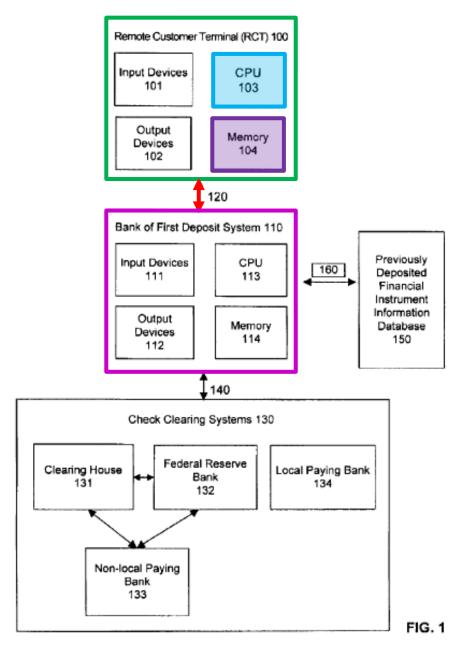
2. <u>Independent Claim 1</u>

a. Element [1-pre]: "A non-transitory computer-readable medium comprising computer-readable instructions for depositing a check that, when executed by a processor, cause the processor to:"

As discussed in Section VIII, element [1-pre] is limiting, with "depositing a check" construed as "providing a check to a depository in a form sufficient to allow money to be credited to an account." *Acharya* discloses element [1-pre], or at least renders it obvious. EX1002, ¶85.

Acharya discloses "a non-transitory computer-readable medium comprising computer-readable instructions for depositing a check." As shown in Figure 1 (reproduced below), the Remote Customer Terminal 100 includes a processor CPU (Central Processing Unit) 103 and a memory 104 and communicates with the BOFD via a communication link 120 that is "suitable for use in the invention." EX1003, 6:21.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



Id., FIG. 1.

Acharya's "RCT memory 104 may be contained on any of a wide variety of media or medium utilized to hold instructions and/or data used in the invention [i.e., 'a system and method for initiating a deposit transaction'] and may take on any of a variety of physical forms ... for example, ... a hard disk, a floppy disk, an optical

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

disk, a magnetic tape, a RAM, a ROM, a PROM, an EPROM," *Id.*, 4:53-62. *See also* EX1003, 4:63-65 ("Certain instructions may also be stored in RCT memory 104 and executed by the CPU 103, for example, to assist in communication and data collection functions."). EX1002, ¶¶86-87.

Acharya further discloses that these "instructions" are for "providing a check to a depository in a form sufficient to allow money to be credited to an account." For example, Acharya discloses that "[t]he invention relates generally to a system and method for initiating a deposit transaction ... e.g. a paper check" (EX1003, 1:17-22) and that "[t]o achieve these and other objects of the invention, a payee would deposit a financial instrument, such as a third party paper check, using a Remote Customer Terminal (RCT) that can communicate with a BOFD system." Id., 2:45-48. See also id., 3:14-33 ("[T]he banking customer forwards the digital image to the BOFD system" and "[t]he automated system ... forward[s] the digital image ... to a clearing house Once the transaction has cleared the paying bank, the BOFD system issues a permanent credit to the banking customer. Accordingly, the banking customer has initiated deposit of a financial instrument from a third party, such as a paper check..."), 8:48-57, 9:11-26. See also id., FIGS. 1-3. EX1002, ¶88.

Further, as discussed below in Sections X.A.2.b-X.A.2.d [elements [1a]-[1c]], these instructions, when executed by a processor, cause the processor to perform

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

certain steps including, for example, those provided below in elements [1a]-[1c] when combined with Luo. EX1002, ¶87.

b. Element [1a]: "monitor an image of the check in a field of view of a camera of a mobile device with respect to a monitoring criterion using an image monitoring and capture module of the mobile device;"

Acharya/Luo renders this limitation obvious. EX1002, ¶89.

1) "monitor[ing] an image of the [object]"

Luo teaches "monitor[ing] an image of the [object]." Luo discloses "an improved method and system for capturing the frontal image of an object having at least two substantially straight edges 205." EX1004, 7. Luo explains that "when the system 100 is in the document capture mode, the system 100 provides the user with an image of a captured object, such as a business card, only when the straight edge 205 of the business card is substantially parallel to the corresponding reference line 135 displayed in the preview window 125." Id., 5. "The reference line 135 is used to guide the user of the system 100 to position the image sensor 115 in an appropriate orientation with respect to, for example, a business card object." Id., 4. EX1002, ¶¶90-92.

Luo's Figure 5 shows "reference lines 135" (EX1004, 5) that are displayed in the "preview window 125." EX1004, 3. As explained above, "when the straight edge 205 [of the object] displayed on the preview window 125 is substantially

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

parallel to the corresponding reference line[s]⁷ 135, the system 100 can automatically capture the selected image." *Id.*, 6. To enable the image capture only when the **straight edges** of the image are substantially parallel with the corresponding reference lines, *Luo*'s system monitors the image in the preview window 125. *Id. See also, id.*, 3, ("[A] real-time image displayed in the preview window 125 is only transient, and it is captured into system 100's memory only when the user activates a shutter button (not shown), a timer, or other image capture trigger mechanism."); *id.*, 5 ("[I]mage edge detection techniques can be used to reliably calculate the angle between a specific reference line 135 and the corresponding straight edge 205 in the document preview image."); *id.*, 6 ("[A]dditional geometric calibration techniques may be used to measure whether the object plane 310 is aligned with the image plane 320."). EX1002, ¶92.

⁷ Luo explains that "In FIG. 5, three reference lines 135 are shown; however

^{...}different numbers of reference lines 135 may be used ... such as two, three, four or more baselines 135." EX1004, 5.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

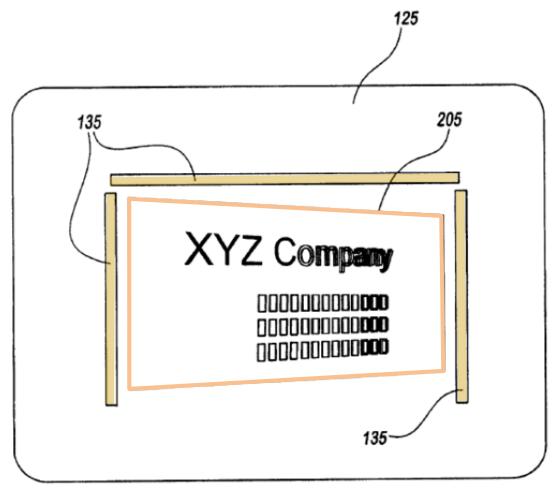


Fig. 5

Id., FIG. 2. EX1002, ¶92.

2) "monitor an image of the [object] ... with respect to a monitoring criterion"

As discussed in Section VIII, the term "monitoring criterion" is construed as "one or more features of a check image that provide information about the suitability of the image to represent the check." Under this construction, *Luo* teaches

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

"monitor[ing] an image of the [object] ... with respect to a monitoring criterion." EX1002, ¶93.

Specifically, Luo teaches monitoring whether a "straight edge 205" of an object whose image is being "displayed in the preview window 125 is substantially parallel to the corresponding reference line 135" and "only when the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135 can the image of the object be captured." EX1004, 7. The alignment with these "reference line[s]"—i.e., monitoring criterion—"provide[s] information about the suitability of the image to represent a check." As Luo explains, the alignment with the reference lines indicates the amount of the "projective distortion" of the object in the image, which tends to "make ... the image blurry." Id., 5. When "the object plane 310 is substantially parallel to the image plane 320 ... the projective distortion in the image is reduced, and the image is clearer and more accurate" (id., 7), and thus more suitable to represent a check. Indeed, *Luo* explains that "[w]ith reduced projective distortion" "an optical character recognition process" may be "performed on a text image, with high accuracy" (id., 7), which is often one of the steps used by check processing systems to electronically process a check image (see EX1003, 3:15-19, 4:63-5:6, 5:9-12). Accordingly, the alignment with the reference lines (shown below in Figure 2), "provide[s] information about the suitability of the image to represent a check."

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

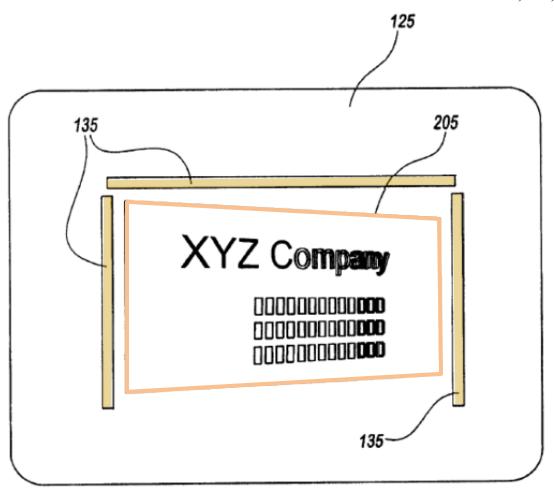


Fig. 5

Id., FIG. 2. EX1002, ¶¶94-96.

In fact, the '571 patent describes an alignment guide as an example of monitoring criterion: "[i]n an implementation, the positioning of the check 108 in the image 230 may be compared with an alignment guide." EX1001, 7:38-48. The '571 patent's alignment guide works similarly to *Luo*'s reference lines: "the image 230 may be compared with an alignment guide" using "measurements" "to determine the check's position with respect to the alignment guide" "to determine whether the check's positioning in the image 230 is proper or sufficient for further

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

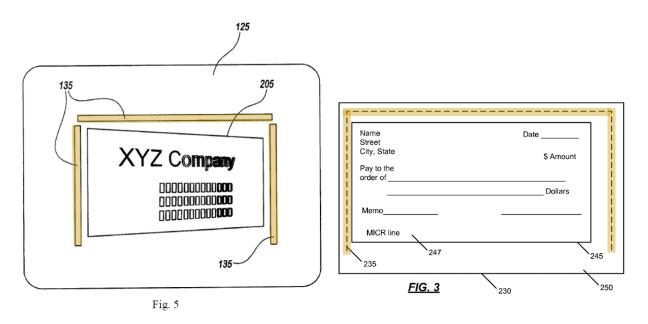
processing of the image." EX1001, 7:38-48. Similarly, Luo monitors whether "the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135." EX1004, 7. See also EX1001, 7:48-52 ("[E]dge detection ... may be used in such measurements (e.g., in measuring the distance from the check 108 in the image 230 to the alignment guide)."). In addition, the '571 patent's alignment guide "may be overlaid on the camera feed of the mobile device 106" and "take any shape such as ... parallel lines, etc., for example." Id., 7:58-62. Id., 4:3-6 ("The monitoring criteria may be based on ... skewing"). The '571 patent also describes the same type of "geometric calibration techniques" taught earlier in Luo when it discloses "measurements" "to determine the check's position with respect to the alignment guide" "to determine whether the check's positioning in the image 230 is proper or sufficient for further processing of the image." Id., 7:45-48. EX1002, ¶¶97-98.

Indeed, as shown in *Luo*'s Figure 2 (reproduced below), *Luo*'s **reference line**135 including **parallel lines** and projected onto the **preview window** 125 includes
the above-noted features of '571 patent's "alignment guide":

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Luo, FIG. 5

'571 Patent, FIG. 3

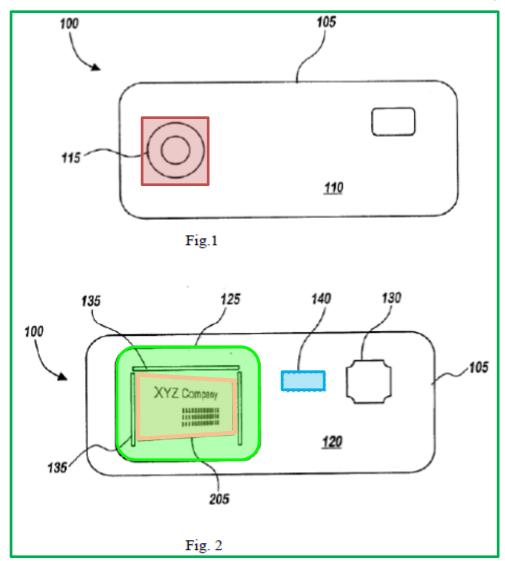


EX1004, FIG. 5; EX1001, FIG. 3. EX1002, ¶99.

3) "monitor an image of the [object] in a field of view of a camera of a mobile device"

Luo discloses that the "image" is "monitor[ed] ... in a field of view of a camera of a mobile device." Luo's Figures 1-2 depict a handheld camera system 100 including an "image sensor 115 adapted to receive an image" and a "preview window 125" that functions as a "viewfinder" that "display[s] in real time any moving image of the scene in front of the image sensor 115." EX1004, 3. The "moving image of the scene in front of the image sensor 115" is a "field of view of a camera."

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



Id., FIGS. 1 and 2. EX1002, ¶100.

Moreover, *Luo*'s Camera System 100 is a "mobile device" as the term is construed herein: a "computing device capable of being easily moved and that is controlled by a mobile operating system." First, the Camera System is a "computing device" because it includes a Processor 140. EX1004, 8. Second, the Camera System is "a handheld electronic device," so it is "capable of being easily moved." *Id.*, 1. Third, *Luo*'s system "may consist of one or more conventional"

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

processors and uniquely stored program instructions that control the operation of one or more processors, as well as ... features for capturing the front of an object ..." thus disclosing, or at least rendering obvious, a "mobile operating system." *Id.*, 8. *See also id.*, 1 ("[T]oday's digital cameras are often integrated into mobile phones, personal digital assistants (PDAs), and laptops."). To the extent *Luo* does not disclose or render obvious "mobile operating system," *Acharya* discloses that the "RCT" [Remote Consumer Terminal] may be a "wireless handheld device" "running ... Windows MobileTM" EX1003, 4:18-30. EX1002, ¶¶101-103.

4) "using an image monitoring and capture module"

Luo discloses "using an image monitoring and capture module." According to the '571 patent, "the image monitoring and capture module 456 may include the camera 207 contained within the mobile device 106." EX1001, 13:1-3. Luo discloses "a camera housing 105 incorporating ... an image sensor 115 adapted to receive an image" where the image sensor may "contain conventional lenses and optics, as well as digital image sensors, such as a charge coupled device (CCD) sensor, a CMOS sensor, and so on." EX1004, 3. See also id., 1 ("[T]oday's digital cameras are often integrated into mobile phones, personal digital assistants (PDAs), and laptops."). Furthermore, Luo teaches that "the embodiments described herein may consist of one or more conventional processors and uniquely stored program instructions that control the operation of one or more processors." Id., 8. As

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

explained in Section X.A.1, a POSITA would have recognized that the implementation details taught by *Luo* would apply to *Acharya*'s "digital camera" RCT (EX1003, 4:18-20) as instructions (i.e., software) stored in memory and executed by the CPU 103. EX1002, ¶104.

5) "monitor an image of the check"

Acharya teaches capturing an image of a "check." See, e.g., EX1003, Abstract ("a financial instrument, such as a paper check"), 3:12-13 ("[T]he banking customer captures the digital image of the financial instrument [e.g., check] by the scanner or the digital camera...."). A POSITA would have found it obvious to combine Acharya and Luo to "monitor an image of the check." A POSITA would have recognized that Luo's teachings would be readily applied to a check capture system because Luo's "object" includes "rectangular, triangular, or other shaped pieces of paper, such as business cards, or other objects having straight edges 205 and a surface" (EX1004, 6), features which include key attributes of a paper check. See also Section X.A.1 (explaining that Acharya and Luo are directed to similar types of documents). EX1002, ¶105.

A POSITA would have found it obvious to combine *Acharya* and *Luo* to incorporate *Luo*'s teaching of monitoring using a monitoring criterion into *Acharya* because, as explained above in Section X.A.1, *Luo* provides details of how to

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

determine that an image is suitable for capture. Thus, *Acharya* in combination with *Luo* teaches element [1a]. EX1002, ¶106.

c. Element [1b]: "capture the image of the check with the camera when the image of the check passes the monitoring criterion; and"

As discussed in Section VIII, "when the image of the check passes the monitoring criterion" is construed to mean "at or after the moment the image of the check passes the monitoring criterion," and "passes the monitoring criterion" to mean "determining that the quality of the monitored image feature is within acceptable thresholds so that check data can be electronically obtained from the image without error during electronic processing and clearing." Under these constructions, *Acharya/Luo* teaches element [1b]. EX1002, ¶107.

Acharya discloses "capture the image of the check with the camera." For example, Acharya discloses that "the banking customer captures the digital image of the financial instrument" (EX1003, 3:12-13), "e.g. a paper check" (id., 1:23), "by the digital camera" (id., 3:13). EX1002, ¶108.

Luo teaches the additional requirements that the image of the check is captured "at or after the moment the image of the check passes the monitoring criterion." For example, Luo teaches that:

• "the [camera] system 100 can automatically **capture** the selected image" (EX1004, 6)

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

- "when the straight edge 205 [of an object whose image is] displayed on the preview window 125" (id.)
- "passes the monitoring criterion" identified in element [1a] of whether a "straight edge 205" "is substantially parallel to the corresponding reference line 135." *Id.*, 7.

See also id., Abstract. Accordingly, a POSITA would have understood Luo's automatic capture to occur "at or after the moment the image of the [document in the field of view]" is "substantially parallel to the corresponding reference line." EX1002, ¶109-111.

Luo's determination of whether the image is substantially parallel to the corresponding reference line teaches "determining that the quality of the monitored image feature is within acceptable thresholds so that check data can be electronically obtained from the image without error during electronic processing and clearing." As discussed in Section X.A.2.b.2), alignment with the reference lines reduces projective distortion and reduces blur. Luo teaches that the captured "well-focused and clear document images" make "the optical character recognition of any text printed in the document effective and reliable." EX1004, 4. This teaching meets the requirement "that check data can be electronically obtained from the image without error during electronic processing and clearing" because, as explained supra Section X.A.1, the image in Acharya/Luo is the check image of Acharya having

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

check data such as "MICR line, RTN [Routing Transit Number], account number, amount of financial instrument, [and] date of financial instrument," and the electronic check processing in *Acharya* also involves optical character recognition. *See* EX1003, 3:15-19, 4:63-5:6, 5:9-12. EX1002, ¶112.

Thus, a POSITA would have found it obvious to combine *Acharya* and *Luo* to incorporate *Luo*'s teaching of capturing an image when the image passes a monitoring criterion into *Acharya* for the reasons provided above in Section X.A.1. EX1002, ¶113.

d. Element [1c]: "provide the image of the check from the camera to a depository via a communication pathway between the mobile device and the depository."

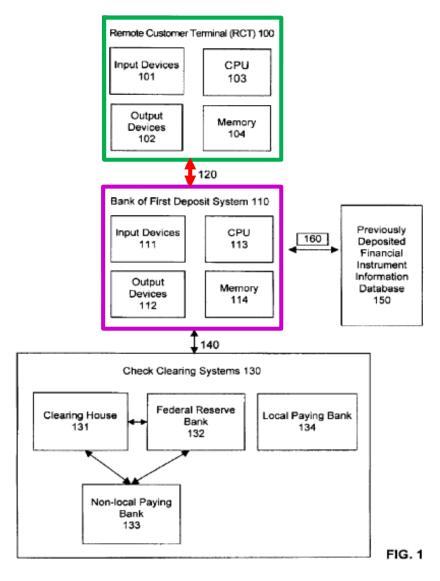
Acharya discloses element [1c]. Acharya discloses a "system and method for initiating a deposit transaction" for a "financial instrument, such as a paper check" using a "Remote Customer Terminal (RCT) ... connected to a bank system." EX1003, Abstract. The Remote Customer Terminal includes a "wireless handheld device" (EX1003, 5:26) that includes a "digital camera" (id., 3:2) and, as shown in Figure 1 (reproduced below), the Remote Customer Terminal 100 communicates with a BOFD System 110 "via a communication link [communication pathway] 120." Id., 5:54-58. The BOFD is "the bank first receiving a paper check for deposit." Id., 1:59-60. This is an example of a "depository" because, according to the '571 patent, a "depository" "may include a

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

bank in which the user 102 has a deposit account...." EX1001, 6:23-24. Moreover, the communication link 120 runs directly from the "mobile device" (Remote Customer Terminal 100) to the "depository" (Bank of First Deposit). EX1002, ¶114.

Acharya explains "the banking customer captures the digital image of the financial instrument by ... the digital camera ... and prepares a file storing the digital image." EX1003, 3:12-14. Finally, "[u]pon prompting by the BOFD system, the banking customer forwards [i.e., "provide[s]"] the digital image [of the financial instrument such as a check] to the BOFD system." Id., 3:14-16. A POSITA would have understood that the digital image is forwarded over the communication link because "[t]he RCT 100 and BOFD system 110 communicate with each other via [the] communication link 120." Id., 5:53-54.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



Id., FIG. 1. EX1002, ¶115.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

3. Dependent Claim 2

a. Claim 2: "The non-transitory computer-readable medium of claim 1, further comprising instructions that provide feedback, via the mobile device to a user of the mobile device, regarding the image of the check with respect to the monitoring criterion prior to capturing the image of the check."

As discussed in Section X.A.2 (claim 1), Acharya/Luo teaches "[t]he non-transitory computer-readable medium of claim 1," including "capturing the image of the check" using the "mobile device." EX1002, ¶116.

Acharya/Luo teaches the remaining portion of claim 2 in view of the plain and ordinary meaning of "feedback ... regarding the image of the check with respect to the monitoring criterion." See Section VIII (claim construction). The '571 patent discloses that "[t]he feedback may advise the user 102 to move the camera 207 or the check 108 or adjust the lighting or the background, for example. The feedback may also advise the user 102 when the image 230 passes the one or more monitoring criteria and to capture the image of the check 108." EX1001, 7:23-28. See also id., 1:51-56. Luo, too, teaches providing these types of feedback. Luo teaches that feedback may be provided to "indicate to the user that an appropriate number of reference lines 135 are substantially parallel to the respective straight edges 205 of the object depicted in the preview window 125," including:

• "[A]n alarm composed of sounds, such as a clicking sound output from the camera system 100";

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

- "[L]ight illuminated in the preview window 125" or "light illuminated elsewhere in the camera system 100"; and
- "[A]n image indicator" "displayed on the preview window 125, for example, when each reference line 135 is substantially parallel to a corresponding straight edge 205" that "may change color or flicker individually."

EX1004, 6. EX1002, ¶¶117-118.

A POSITA would have understood that *Luo*'s sound, light, or image indicators are "instructions that provide feedback" about whether or not the monitoring criterion (i.e., alignment of the reference line 135 with edges of the document) is met. EX1004, 6. EX1002, ¶119.

Luo's sound, light, or image indicators also satisfies USAA's narrow construction of "feedback": "instructions to the user regarding actions to take in order to satisfy one or more monitoring criteria based on analysis of the monitoring criteria by the system." For example, the "image indicator" mentioned above allows that "each reference line" "displayed on the preview window 125" "may change color or flicker **individually**" based on the monitoring criterion of "when each reference line 135 is substantially parallel to a corresponding straight edge 205." EX1004, 6. This teaching provides, or at least renders obvious providing, "instructions to the user regarding actions to take" because, upon observing a reference line in its initial color (prior to changing color), the user would have

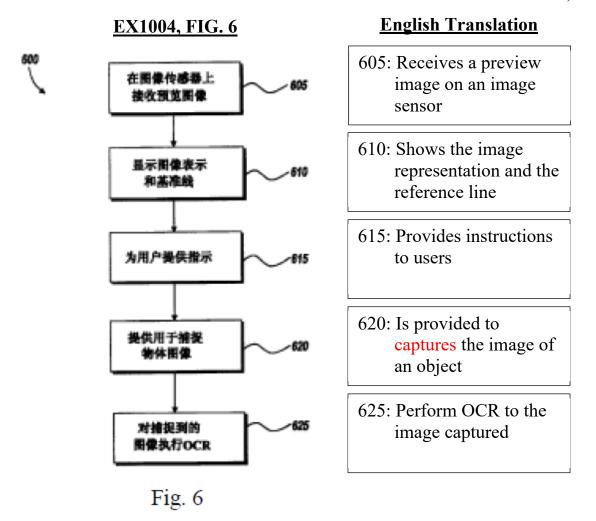
Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

understood to adjust the relative position of the camera and the object in order to satisfy the monitoring criterion. The same reasoning applies where the flicker is the source of feedback instead of (or in addition to) a color change. EX1002, ¶119.

In addition, *Luo*'s indicators (the claimed "feedback") are provided as "output from the camera system 100", "in the preview window 125", or "elsewhere in the camera system 100"—i.e., "via the mobile device." EX1004, 6. Moreover, the "preview window" makes the camera system "user friendly" and "functions as viewfinder" (id., 7) that "display[s] in real time any moving image of the scene in front of the image sensor" (id., 3) and also displays "the reference line" which "guide[s] the user of the system 100 to position the image sensor 115 in an appropriate orientation" (id., 4). Thus, the feedback is to "a user of the mobile device." EX1002, ¶120.

Furthermore, the sequence of operations disclosed by *Luo* requires that the feedback is "prior to capturing the image of the check." As shown in *Luo*'s Figure 6 (reproduced below), step 615 requiring "instructions" to be provided to user occurs in sequence prior to capturing "the image of the object":

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



EX1004, Figure 6. *See also id.*, claim 5 ("provides instructions to the user ... before capturing the image of the object."). EX1002, ¶121.

A POSITA would have found it obvious to combine *Acharya* and *Luo* to incorporate *Luo*'s teaching of feedback into *Acharya* for the reasons provided above in Section X.A.1. EX1002, ¶122.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

4. <u>Dependent Claim 3</u>

a. Claim 3: "The non-transitory computer-readable medium of claim 2, wherein the feedback is provided if the image fails to pass the monitoring criterion."

As discussed in Section X.A.3, Acharya/Luo discloses "[t]he non-transitory computer-readable medium of claim 2." Luo discloses the remaining portion of claim 3, or at least renders it obvious. For example, as noted above, Luo teaches that "each reference line" "displayed on the preview window 125" "may change color or flicker individually" based on the monitoring criterion of "when each reference line 135 is substantially parallel to a corresponding straight edge 205." EX1004, 6. A reference line in its initial color (prior to changing color) is a feedback that the image fails to pass the monitoring criterion with respect to this reference line. In response to observing this color, the user would have understood to change the relative position of the camera and the object. Furthermore, the contrast between a first reference line that has changed color and a second reference line still in its initial color is feedback to the user to move the camera in a particular direction in order to satisfy the monitoring criterions with respect to the first reference line while continuing to satisfy the monitoring criterion with respect to the second criterion. The same reasoning applies where the flicker is the source of feedback instead of (or in addition to) a color change. EX1002, ¶123.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Furthermore, *Luo* explains that "only when the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135 can the image of the object be captured." EX1004, 7. Preventing the user from capturing an image is feedback that the "image fails to pass the monitoring criterion." EX1002, ¶124.

Finally, when operating the Remote Customer Terminal (RCT) of *Acharya/Luo*," a user would recognize that the absence of *Luo*'s alarm, light, and image indicators (EX1004, 6) is feedback that the "*image fails to pass the monitoring criterion*," prompting the user to adjust the position of the RCT in order to obtain an image in the field of view that passes the monitoring criterion. EX1002, ¶125.

A POSITA would have found it obvious to combine *Acharya* and *Luo* to incorporate *Luo*'s teaching of providing feedback if the image fails to pass the monitoring criterion into *Acharya* for the reasons provided above in Section X.A.1. EX1002, ¶126.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

5. <u>Dependent Claim 6</u>

a. Claim 6: "The non-transitory computer-readable medium of claim 1, wherein capturing the image of the check is performed automatically without user intervention when the image of the check passes the monitoring criterion."

As discussed in Section X.A.2, Acharya/Luo discloses "[t]he non-transitory computer-readable medium of claim 1." Acharya/Luo also discloses, or at least renders obvious, the remaining portion of claim 6 requiring "capturing the image of the check is performed automatically without user intervention when the image of the check passes the monitoring criterion." For example, as noted above in Section X.A.2.d (addressing element [1c]), "when the straight edge 205 displayed on the preview window 125 is substantially parallel to the corresponding reference line 135 [i.e., when the monitoring criterion is met], the system 100 can automatically capture the selected image" EX1004, 6. EX1002, ¶127.

A POSITA would have found it obvious to combine *Acharya* and *Luo* to incorporate *Luo*'s teaching of automatic capture of the image into *Acharya* for the reasons provided above in Section X.A.1. EX1002, ¶128.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

6. <u>Independent Claim 9</u>

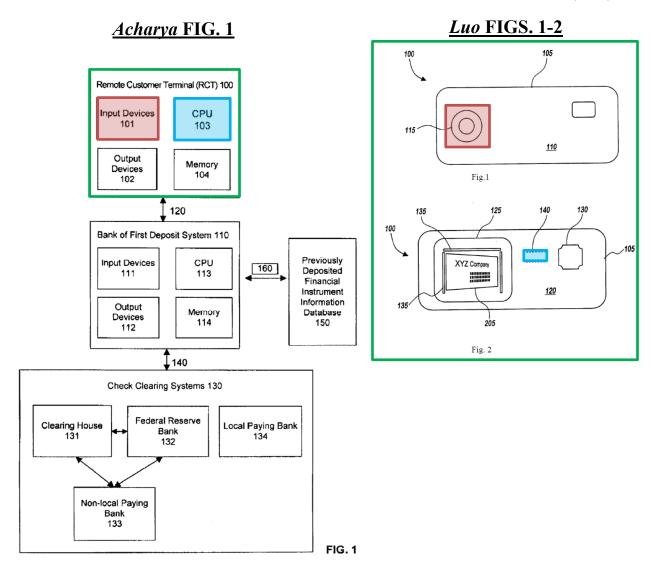
a. Element [9-pre]: "A non-transitory computer-readable medium comprising computer-readable instructions for depositing a check that, when executed by a processor, cause the processor to:"

Acharya teaches element [9-pre] for the same reasons it teaches element [1-pre]. EX1002, ¶129.

b. Element [9a]: "initialize a software object on a mobile device operated by a user, the software object configured to communicate with a camera;"

Acharya/Luo renders this limitation obvious. As discussed above in Section X.A.1 (combination of Acharya and Luo), Acharya's Remote Customer Terminal 100 is implemented as Luo's Camera System 100. As shown below, Acharya's Input Devices 101 are implemented as Luo's Image Sensor 115 (camera) and the CPU 103 is implemented as Luo's Processor 140.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



EX1003, FIG. 1; EX1004, FIGS. 1-2.

Acharya teaches that "[c]ertain instructions may also be stored in RCT memory 104 and executed by the CPU 103, for example, to assist in communication and data collection functions." EX1003, 4:63-65. *Luo* is consistent, specifically teaching that "the embodiments described herein may consist of one or more conventional processors and uniquely stored **program instructions** that control the operation of one or more processors." EX1004, 8. Such embodiments include "automatically

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

captur[ing] the selected image" using the "camera system" and "set[ting] the camera system 100 to various photographing modes" *Id.*, 3. Thus, the "programs" (software objects) "*communicate with a camera*." Furthermore, a POSITA would have known that any software object would require initialization during startup or restart of the mobile device. *See also id.*, 3 (teaching a "software switch" "used to set the camera system 100 to various photographing modes"). EX1002, ¶¶130-132.

A POSITA would have found it obvious to combine *Acharya* and *Luo* to incorporate *Luo*'s teaching of a software program into *Acharya* for the reasons provided above in Section X.A.1. EX1002, ¶133.

c. Element [9b]: "monitor an image of the check in a field of view of the camera with respect to a monitoring criterion using an image monitoring and capture module associated with the camera;"

Element [9b] is the same as element [1a], except that "a camera of a mobile device" in element [1a] is replaced by "the camera" in [9b]. Thus, *Acharya/Luo* discloses, or at least renders obvious, element [9b] for the reasons provided in Section X.A.2.b (element [1a]). EX1002, ¶134.

d. Element [9c]: "capture the image of the check using the camera when the image of the check in the field of view passes the monitoring criterion; and"

Element [9c] is the same as element [1b], except that "capture the image of the check with the camera when the image of the check passes the monitoring criterion" in element [1b] is replaced by "capture the image of the check using the

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

camera when the image of the check <u>in the field of view</u> passes the monitoring criterion" in [9c]. But element [1a] of claim 1 also makes clear that the image is in the field of view ("monitor an image of the check <u>in a field of view</u>"), just like element [9c]. In addition, there is no meaningful distinction between capturing the image "using" the camera versus "with the camera." Thus, *Acharya/Luo* teaches element [9c] for the reasons provided in Sections X.A.2.b,X.A.2.c (elements [1a], [1b]). EX1002, ¶135.

e. Element [9d]: "transmit the image of the check from the mobile device to a deposit system configured to clear the check and deposit funds of the check into a deposit account of the user."

Acharya teaches element [9d] for the reasons provided in Section X.A.2.d (element [1c]). EX1002, ¶136.

7. <u>Dependent Claim 10</u>

a. Claim 10: "The non-transitory computer-readable medium of claim 9, further comprising instructions that provide feedback, via the mobile device to the user, when the image of the check in the field of view passes the monitoring criterion, prior to capturing the image of the check."

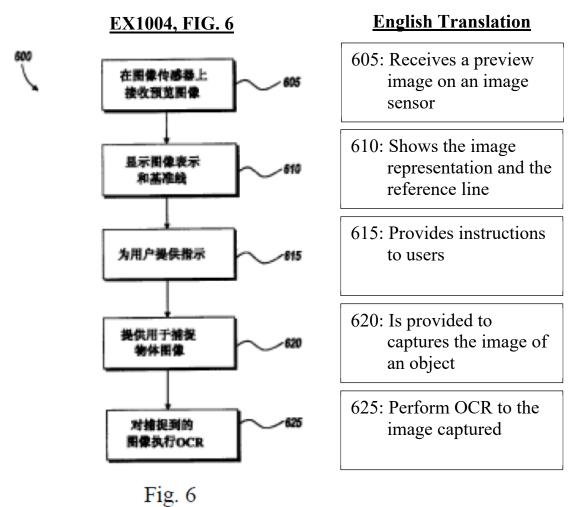
As discussed in Section X.A.6, Acharya/Luo teaches "[t]he non-transitory computer-readable medium of claim 9," including "capturing the image of the check" using the "mobile device." Acharya/Luo also teaches, or at least renders obvious, "instructions that provide feedback, via the mobile device to the user"

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

"prior to capturing the image of the check" for the reasons discussed in Section X.A.3(claim 2). EX1002, ¶137.

In addition, *Luo* teaches the remaining portion of claim 10 requiring that the "feedback" be provided "when the image of the check in the field of view passes the monitoring criterion." As explained above in Section VIII (claim construction), this term means "at or after the moment the image of the check [in the field of view] passes the monitoring criterion." As shown in Figure 1 (reproduced below), *Luo* teaches "in step 615, **when** the straight edge 205 displayed in the preview window 125 is substantially parallel to the corresponding reference line 135"—i.e., when the monitoring criterion is passed—"an indication is provided to the user." EX1004, 7.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571



Id., Figure 6 (615 "[p]rovides instructions to users" 620 "to captures the image of an object"). *See also id.*, 6 (feedback may be provided to "indicate to the user that an appropriate number of reference lines 135 are substantially parallel to the respective straight edges 205 of the object depicted in the preview window 125."). *See also* Section X.A.6.d (addressing "passes the monitoring criterion" in element [9c]). EX1002, ¶138.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

A POSITA would have found it obvious to combine *Acharya* and *Luo* to incorporate *Luo*'s teaching of feedback into *Acharya* for the reasons provided above in Section X.A.1. EX1002, ¶139.

8. Dependent Claim 13

a. Claim 13: "The non-transitory computer-readable medium of claim 9, wherein the monitoring criterion comprises skewing of the image or warping of the image."

As discussed in Section X.A.6, Acharya/Luo teaches "[t]he non-transitory computer-readable medium of claim 9." Luo also discloses, or at least renders obvious, the remaining portion of claim 13, requiring "the monitoring criterion comprises skewing of the image or warping of the image." EX1002, ¶140.

Luo's monitoring criterion allowing capture only "when the straight edge 205 displayed in the preview window 125 is substantially parallel to the corresponding reference line 135" (EX1004, 7) is a monitoring criterion comprising "warping of the image." As the '571 patent explains, "[w]arping, or tilting" "is meant to denote that the check 108 is tilted forward or back with respect to a plane that is perpendicular to a line drawn from the camera lens to the center of the check 108." EX1001, 8:21-24. Luo illustrates such warping in Figure 5 (reproduced below) and describes it as an object being "tilted in relative to [the image plane of] system 100 so that the top straight edge 205 of the card cannot be substantially parallel to the corresponding top reference line 135." EX1004, 5.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

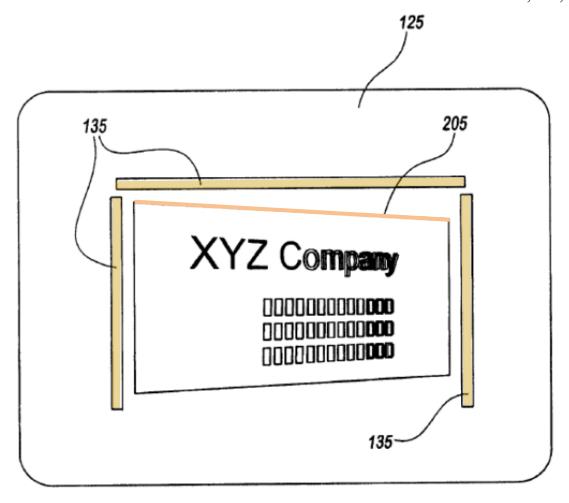


Fig. 5

Id., FIG. 5. EX1002, ¶141.

Luo's monitoring technique also applies to skew, i.e., when an image is "rotated from the horizontal in the image." EX1001, 8:9-10. The '571 patent explains that such skewing may be measured by "measuring the distance from the edge(s) of the check 208 in the image to an alignment guide or the edge of the field of view...." Id., 8:9-13. This is the same as Luo's determination of whether a "straight edge 205 displayed in the preview window 125 is substantially parallel to the corresponding reference line [i.e., alignment guide] 135." EX1004, 7.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Specifically, *Luo* discloses that "image edge detection techniques can be used to reliably calculate the angle between a specific **reference line** 135 and the corresponding **straight edge** 205 in the document preview image." *Id.*, 5. *See also id.*, 6. EX1002, ¶142.

A POSITA would have found it obvious to combine *Acharya* and *Luo* to incorporate *Luo*'s teaching of skewing and/or warping as a monitoring criterion into *Acharya* for the reasons provided above in Section X.A.1. EX1002, ¶144.

B. Ground II: Claims 4 and 5 of the '571 Patent Would Have Been Obvious over *Acharya* combined with *Luo* and *Nepomniachtchi*

1. Combination of Acharya/Luo and Nepomniachtchi

Acharya and Nepomniachtchi are squarely in the same field of endeavor that includes "mobile image capture" (EX1016, Title; EX1033, [0005]) using "a mobile telephone handset" that "may include a camera" (EX1016, [0054]; EX1033, [0021]) and for "a variety of documents, including financial documents such as personal checks" (EX1016, [0053]; EX1033, [0020]). EX1002, ¶69, 145.

Nepomniachtchi teaches that, in addition to "prompt[ing] the user of the device to take a picture of the front of the document" during mobile image capture, "an image of the back of the document might be necessary because the back of the check might need to be endorsed" and "the application may prompt the user to take the image [of the back of the check]." EX1016, [0078]; EX1033, [0045]. A POSITA would have also had the common knowledge that an endorsement on the

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

back of a check is desired to deposit the check. *See also* EX1016, [0056] ("[I]n order to process a check that is to be deposited, it might be necessary to electronically read the ... the signature 112 on the check."); EX1033, [0023]. To address this need, a POSITA would have been motivated to add functionality to *Acharya/Luo* to capture an image of the back of the check as a second image. EX1002, ¶70,146.

Nepomniachtchi also teaches that "[i]f the quality of an image is determined to be poor, a user may be prompted to take another image." EX1016, [0062]; EX1033, [0029]. In the context of Acharya/Luo, a POSITA would have understood that the quality of an image would be poor when it fails the monitoring criterion. A POSITA would have been motivated to incorporate this feature into Acharya/Luo based on Luo's teaching that "unideal variable factors such as the distance from the lens" to yield images that "may contain defects such as projective distortion" which impair optical character recognition on the document. EX1004, Nepomniachtchi's teaching provides an operational solution to this problem. Moreover, Nepomniachtchi provides a similar motivation to Luo by teaching that a "document image taken using a mobile device might have one or more of the defects discussed" (EX1016, [0062]; EX1033, [0029]) such as "optical defects, such as outof-focus images... unequal contrast or brightness, or other optical defects" (EX1016, [0058]; EX1033, [0025]). EX1002, ¶70,147.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Acharya/Luo would have readily been combined with Nepomniachtchi and the POSITA would have had a reasonable expectation of success because capturing both sides of a check is a simple extension of Acharya/Luo's existing monitoring, feedback, and check capture functionality. Similarly, capturing a second image of the same side of the check after ascertaining that the image quality of a first image was poor would have also been a simple extension. These approaches would have been obvious to a POSITA they each "combine[e] prior art elements according to known methods to yield predictable results" "us[ing] known technique[s] to improve similar devices (methods, or products) in the same way." EX1002, ¶148.

2. Dependent Claim 4

a. Claim 4: "The non-transitory computer-readable medium of claim 3, wherein the feedback comprises instructions for the user to follow to obtain a second image of the check in the field of view of the camera that passes the monitoring criterion."

As discussed in Section X.A.4, *Acharya/Luo* teaches "[t]he non-transitory computer-readable medium of claim 3." EX1002, ¶149. *Nepomniachtchi* discloses the remaining portion of claim 4, or at least renders it obvious. Like *Acharya* and the '571 patent, *Nepomniachtchi* relates to "mobile image capture" (EX1016, Title; EX1033, [0005]), using "a mobile telephone handset" that "may include a camera" (EX1016, [0054]; EX1033, [0021]) and for "a variety of documents, including ... personal checks" (EX1016, [0053]; EX1033, [0020]). *Nepomniachtchi* teaches that

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

"an application running on the mobile communication device may prompt the user of the device to take a picture of the front of the document" and that "[t]he back of the document might also be imaged. For example, if the document is a check, an image of the back of the document might be necessary because the back of the check might need to be endorsed. If the back of the document needs to be imaged, the application may prompt the user to take the image." EX1016, [0078]; EX1033, [0045]. EX1002, ¶149.

Nepomniachtchi also discloses that "a user may be prompted to take another [i.e., second] image" "[i]f the quality of an image is determined to be poor." EX1016, [0062]; EX1033, [0029]. Instructing the user to obtain a second image of the check is operationally no different than the instructing capture of a first image of the check insofar as the image will only be captured when it passes the monitoring criterion. Moreover, a POSITA would have been motivated to combine Acharya/Luo with Nepomniachtchi. See infra Section X.B.1. EX1002, ¶150.

Thus, Nepomniachtchi teaches at least two instances of "feedback compris[ing] instructions for the user to follow to obtain a second image of the check." A POSITA would have found it obvious to combine Acharya/Luo and Nepomniachtchi to incorporate Nepomniachtchi's teaching of instructions of obtain a second image into Acharya/Luo for the reasons provided above in Section X.B.1.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

EX1002, ¶151.

3. <u>Dependent Claim 5</u>

a. Claim 5: "The non-transitory computer-readable medium of claim 4, wherein the feedback is provided visually in the field of view of the camera."

As discussed in Section X.B.2, Acharya/Luo, and Nepomniachtchi combined disclose "[t]he non-transitory computer-readable medium of claim 4." Luo discloses the remaining portion of claim 5, or at least renders it obvious. For example, Luo teaches that feedback may comprise "light illuminated in the preview window 125." EX1004, 6. Luo explains that the "preview window 125" is "for displaying the image received by the image sensor 115" and "can function as a viewfinder of a conventional camera and display in real time any moving image of the scene in front of the image sensor 115." Id., 3. See also id., claim 13. Thus, in addition to providing feedback, Luo's preview is provided visually in the window, i.e., in "the field of view of the camera." A POSITA would have found it obvious to use Luo's visual mechanism to provide the user prompt as taught in Nepomniachtchi discussed in Section X.B.2 because it merely amounts to applying a known visual mechanism to the prior art device (Acharya/Luo/Nepomniachtchi) to yield the

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

predictable result of providing the user prompt as taught in *Nepomniachtchi*. EX1002, ¶152.

C. <u>Ground III: Claim 12 of the '571 Patent Would Have Been</u> Obvious over *Acharya/Luo* in view of *Yoon*

1. Dependent Claim 12

a. Claim 12: "The non-transitory computer-readable medium of claim 9, wherein the monitoring criterion comprises light contrast or light brightness of the image."

As discussed in Section X.A.6, Acharya/Luo teaches "[t]he non-transitory computer-readable medium of claim 9." Youn teaches the remaining portion of claim 12 requiring that "the monitoring criterion comprises light contrast or light brightness of the image." EX1002, ¶161.

Yoon specifically identifies image brightness as one of these "unideal variable factors" that can lower the "probability of satisfactorily recognizing the business card in order to obtain the information contained in the business card" EX1005, [0007]. To address this problem, Yoon teaches a portable terminal that uses image brightness as a monitoring criterion to determine when an image is auto captured by the portable terminal. As shown in Figure 1 (reproduced below), Yoon's portable

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

terminal includes "a controller 100, a camera unit 102, an image processor 104, and a display unit 106.

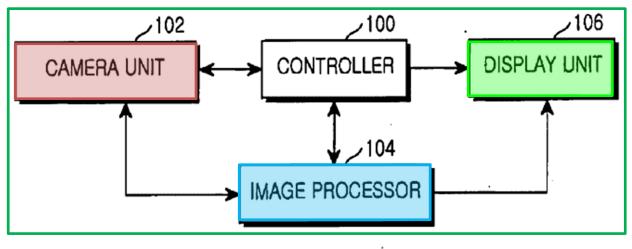


FIG.1

Id., FIG. 1 (rearranged to move "FIG. 1" closer to the diagram). EX1002, \$\\$62,63,162.

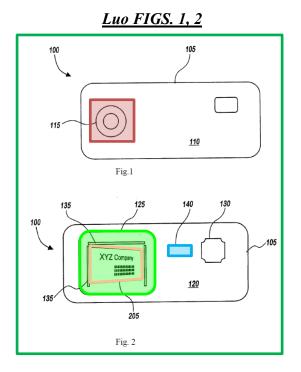
Yoon's technique "converts the brightness of an image received from the camera sensor into measurable brightness data, ... checks a brightness environment under which the business card is to be photographed, and controls whether to perform automatic photographing on the business card." EX1005, [0019]. In addition, "whether the current brightness is appropriate for photographing the business card may be determined by comparing the brightness data with a reference brightness value for recognizing the business card." *Id.*, [0025]. "If it is determined that the current brightness is not appropriate for photographing the business card, the portable terminal displays a message indicating this fact on the

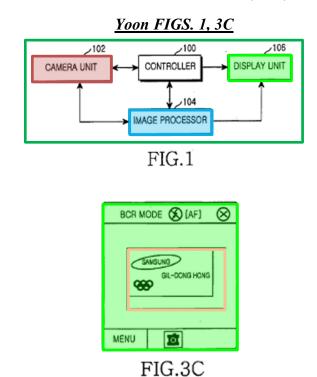
Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

display unit 106 in step 227, and then returns to operation 205." *Id.*, [0026]. Thus, the controller uses the "brightness data" as a monitoring criterion and determines whether to capture an image based on this criterion. EX1002, ¶64,163.

A POSITA would have found it obvious to combine *Acharya/Luo* and *Yoon* to incorporate *Yoon*'s teaching to use light contrast and brightness as a monitoring criterion into *Acharya/Luo*. A POSITA would have recognized that this approach was directly applicable to check image capture to predictably increase the likelihood of obtaining images suitable for "convert[ing] machine printed characters on ... the digital image of the financial instrument to electronic text." EX1003, 4:67-5:2. In the *Acharya/Luo/Yoon* combination depicted below, *Yoon*'s Camera Unit is implemented as *Acharya/Luo*'s camera, *Yoon*'s Display Unit would be implemented as *Acharya/Luo*'s preview window, and *Yoon*'s Image Processor would be implemented using *Acharya/Luo*'s CPU/processor:

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571





EX1004, FIGS. 1 and 2 (views of camera system), EX1005, FIGS. 1 and 3C (diagram of portable terminal and screen image). EX1002, ¶¶153-156.

A POSITA would have readily combined *Acharya/Luo* with *Yoon* using known techniques. *Acharya/Luo* teaches that "[c]ertain instructions may also be stored in RCT memory 104 and executed by the CPU 103, for example, to assist in communication and data collection functions." EX1003, 4:63-65. Similarly, *Yoon* teaches that "embodiments of the present invention can also comprise computer readable codes...." EX1004, [0031]. Thus, a POSITA would have recognized that the embodiments taught by *Yoon* could also be added as computer readable codes (i.e., software) for execution by the CPU/processor of the combination. EX1002, ¶157.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

A POSITA would have combined *Acharya/Luo* with *Yoon* with a reasonable expectation of success. *Acharya/Luo* would have readily been combined with *Yoon* because *Yoon* employs a complementary monitoring and capture strategy for obtaining improved images, meaning *Yoon*'s technique would have been added to *Acharya/Luo* without changing how *Acharya/Luo* functions. Such an approach would have been obvious to a POSITA because it would both "combin[e] prior art elements according to known methods to yield predictable results" and use a "known technique to improve similar devices (methods, or products) in the same way." *See* M.P.E.P. § 2141. EX1002, ¶158.

Moreover, *Acharya/Luo*, and *Yoon* are directed to similar types of documents. Although *Yoon*'s techniques are applied to a business card, a POSITA would have been motivated to apply the same techniques to paper checks for the same reasons given by *Luo*, namely that, like business cards, paper checks are "rectangular ... shaped pieces of paper ... having straight edges 205 and a surface" EX1004, 6. Given these similarities, a POSITA would have known that *Yoon*'s ability to ability to obtain images of a business card sufficient for "a business card recognition function ... to **recognize** the business card and **manage information regarding the owner** of the business card" would have been equally applicable to obtaining deposit data from paper checks. EX1005, [0006]. EX1002, ¶160.

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Thus, *Acharya/Luo* combined with *Yoon* renders claim 12 obvious. EX1002, ¶164.

XI. DISCRETIONARY DENIAL IS NOT WARRANTED

A. <u>Patent Owner Believes the Co-Pending Litigation Should Not Prevent IPR Institution</u>

On June 23, 2021, PO filed a Petition for *Inter Partes* Review of one of the patents at issue in the co-pending litigation. *See United Services Automobile Association v. PNC Bank, N.A.*, IPR2021-01163, Paper 1 ("786-Petition"). In its Petition, PO urged institution, arguing that all the *Fintiv* factors were either neutral or weighed in favor of institution. *Id.*, 69-72. Several of PO's own arguments also support institution of this petition, as described below.

B. Fintiv Factors Favor Institution

Petitioner respectfully requests the Board not to exercise its discretion to deny institution under *Fintiv*. Petitioner stipulates that, if this IPR is instituted, it will not advance the grounds that are raised or reasonably could have been raised in this IPR in the co-pending district court proceeding, eliminating any overlap between the IPR and the co-pending district court proceeding. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (P.T.A.B. Dec. 1, 2020) (precedential as to § II.A).

The parties have not completed fact or expert discovery, much less completed the briefing of a dispositive invalidity motion on the '571 patent. *See* '786-Petition, 70 ("no significant activity has taken place or is expected to take place by" January

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

2022). Therefore, the parties and the district court have not invested substantially "in the merits of the invalidity positions" pertaining to the '571 patent. *Verizon Bus. Network Servs. Inc. v. Huawei Techs. Co.*, IPR2020-01080, Paper 11, 13-14 (P.T.A.B. Jan. 14, 2021) ("the investment in the parallel proceeding related to the validity issue is minimal" when parties had not submitted dispositive briefing on validity issues).

Although the trial in the district court proceeding is currently scheduled for March 7, 2022 (EX1026 [Docket Control Order])—earlier than the date on which the Board is expected to issue the final written decision in this IPR (around December 2022)—there is a significant uncertainty over the trial date. Judge Gilstrap has scheduled trials for ten other patent cases for the same day, March 7, 2022, five of which were filed earlier than the -00319 Action involving the '571 Patent. EX1030 [Judge Gilstrap Trial List]. It is at the very least uncertain that the '571 patent will be tried on March 7, 2022. Further, Judge Gilstrap is currently considering a motion to consolidate the -00319 Action with the second action filed by PO against Petitioner six months later, which may further delay the trial by months. EX1031 [Motion to Consolidate].

C. New Prior Art and Arguments Favor Institution

Institution of this petition is favored because it presents new prior art and arguments not previously presented to the Office. *Advanced Bionics, LLC v. MED*-

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8-9 (P.T.A.B.

Feb. 13, 2020) (precedential).

None of Acharya, Luo, or Yoon was before the examiner during prosecution

of the '571 patent. While family members of Nepomniachtchi appear on the face of

the '571 patent, none was relied upon in a rejection during the prosecution. The fact

that these references did not serve "as the basis of rejection weighs strongly against

exercising [the Board's] discretion to deny institution under 35 U.S.C. § 325(d)."

Wells Fargo v. USAA, CBM2019-00027, Paper 13 at 10 (P.T.A.B. Oct. 1, 2019).

In addition, although Yoon and some Nepomniachtchi family members were

proffered to the Board in IPR2020-00975 and IPR2019-01082, they were not

presented in the particular combinations presented in this petition.

XII. CONCLUSION

Based on the foregoing, claims 1-6, 9, 10, 12, and 13 of the '571 patent recite

subject matter that is unpatentable. Petitioner requests institution of an inter partes

review to cancel claims 1-6, 9, 10, 12, and 13.

Respectfully Submitted,

Dated: July 7, 2021

/ Monica Grewal/

Monica Grewal

Registration No. 40,056

85

Appx528

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Table of Exhibits for U.S. Patent 8,977,571 Petition for *Inter Partes* Review

Exhibit	Description
1001	U.S. Patent 8,977,571
1002	Declaration of Todd Mowry
1003	U.S. Patent No. 8,768,836
1004	Chinese Patent Application Publication No. CN 1897644A (certified translation attached "A method and system for capturing images")
1005	U.S. Patent Application Publication No. 2007/0262148
1006	RESERVED
1007	File History of U.S. Patent No. 8,977,571
1008	Bruno-Britz, Maria, "Mitek Launches Mobile Phone Check Capture Solution," Bank Systems and Technologies InformationWeek (Jan. 24, 2008).
1009	U.S. Patent No. 7,950,698
1010	U.S. Patent No. 8,290,237
1011-1013	RESERVED
1014	Mitek Systems, "ImageNet Mobile Deposit," presented at "FSTC's 2008 Annual Conference (June 2008)
1015	U.S. Patent Application Publication No. 2006/0164682
1016	U.S. Patent Application Publication No. 2009/0185241
1017-1018	RESERVED
1019	V User Guide, https://www.lg.com/us/support/manuals-documents?customerModelCode=%

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Exhibit	Description
DAIIIDIU	
	20LGVX9800&csSalesCode=LGVX9800, select
	"VERIZON(USA)_en"; The V_UG_051125.pdf
1020	MING Phone User Manual, 2006
1021	U.S. Patent Application Publication No. 2005/0267843
1022	U.S. Patent Application Publication No. 2004/0236647
1023	United Services Automobile Association v. PNC Bank N.A., No. 2:20-cv-319 (E.D. Tex.), Dkt. 112 (June 1, 2021) (P.R. 4-3 Joint Claim Construction and Prehearing Statement)
1024	United Services Automobile Association v. Wells Fargo Bank, N.A., No. 2:18-cv-245 (E.D. Tex.), Dkt. 100 (June 13, 2019) (Claim Construction Memorandum Opinion and Order)
1025	Japanese Patent Application Publication No. 2014-23158 (certified translation attached "Imaging Device")
1026	United Services Automobile Association v. PNC Bank N.A., No. 2:20-cv-319 (E.D. Tex.), Dkt. 48 (Feb. 8, 2021) ("Docket Control Order")
1027-1028	RESERVED
1029	Doermann, D. et al., "Progress in Camera-Based Document Image Analysis," Proceedings of the Seventh International Conference on Document Analysis and Recognition (ICDAR'03), IEEE
1030	Judge Gilstrap March 7, 2022 Trial List ("Judge Gilstrap Trial List")
1031	United Services Automobile Association v. PNC Bank N.A., No. 2:20-cv-00319 (E.D. Tex.), Dkt. 94 (Apr. 19, 2021) ("Motion to Consolidate")
1032	RESERVED

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

Exhibit	Description
1033	U.S. Provisional Patent Application No. 61/022,279

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

CERTIFICATE UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 13,977 words, which is less than the 14,000 words allowed under 37 CFR § 42.24(a)(1)(i).

Respectfully submitted,

Dated: July 7, 2021 /Jonathan P Knight/

Jonathan P. Knight

Reg. No. 69,866

Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571

CERTIFICATE OF SERVICE

I hereby certify that on July 7, 2021, I caused a true and correct copy of the foregoing materials:

- Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571 Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104
- Exhibit List
- Exhibits for Petition for *Inter Partes* Review of U.S. Patent No. 8,977,571 (EX1001-EX1005, EX1007-EX1010, EX1014-EX1016, EX1019-EX1026, EX1029-EX1031, EX1033)
- Power of Attorney
- Fee Authorization
- Word Count Certification Under 37 CFR § 42.24(d)

to be served via Express Mail on the following correspondent of record as listed on PAIR:

BGL P.O. Box 10395 Chicago IL 60610

> /Jonathan P Knight/ Jonathan P. Knight Reg. No. 69,866

Trials@uspto.gov 571.272.7822

Paper No. 19

Entered: January 13, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

IPR2021-01073 Patent 8,977,571 B1

Before JACQUELINE WRIGHT BONILLA, Deputy Chief Administrative Patent Judge.

PANEL CHANGE ORDER Conduct of the Proceeding 37 C.F.R. § 42.5

IPR2021-01073 Patent 8,977,571 B1

The parties are notified that the panel has changed in the above referenced proceeding. *See* PTAB Standard Operating Procedure 1, Rev. 15. Due to unavailability, Administrative Patent Judge Scott B. Howard replaces Administrative Patent Judge Joni Y. Chang¹ on the panel.

Thus, Administrative Patent Judges Michael R. Zecher, David C. McKone and Scott B. Howard now constitute the panel for consideration of all matters in this proceeding. *See* PTAB Standard Operating Procedure 1, Rev. 15. All prior decisions and orders remain in effect. The parties may contact the Board at Trials@uspto.gov if they have questions.

It is ORDERED.

¹ The Board has entered one prior order in this proceeding, which was also concurrently entered in five other proceedings pending between the parties. *See* Paper 10. That order states that the "judges [identified on the order] are paneled in various groups of three in the subject cases." *Id.* at 1 n.2. However, only two of the three judges paneled in this proceeding participated in that order. This information is provided to clarify the record. It has no effect on the Board's prior order.

> IPR2021-01073 Patent 8,977,571 B1

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PUBLIC VERSION

Paper 20

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A., Petitioner,

V.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

> IPR2021-01073 Patent 8,977,571 B1

Before MICHAEL R. ZECHER, DAVID C. McKONE, and SCOTT B. HOWARD, Administrative Patent Judges.

HOWARD, Administrative Patent Judge.

DECISION Granting Institution of Inter Partes Review 35 U.S.C. § 314

IPR2021-01073 Patent 8,977,571 B1

INTRODUCTION

A. Background and Summary

PNC Bank, N.A., filed a Petition requesting *inter partes* review ("IPR") of claims 1–6, 9, 10, 12, and 13 of U.S. Patent No. 8,977,571 B1 (Ex. 1001, "the '571 patent"). Paper 3 ("Petition," "Pet."). United Services Automobile Association ("Patent Owner") filed a Preliminary Response. Paper 8 ("Prelim. Resp."). With our authorization (Paper 10), Petitioner filed a Reply to the Preliminary Response (Paper 12, "Pet. Prelim. Reply")² and Patent Owner filed a Preliminary Sur-Reply (Paper 15, "PO Prelim. Surreply). 3

We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). *Inter partes* review may not be instituted unless "the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a) (2018). "When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim." 37 C.F.R. 42.108(a) (2021).

¹ A public version of the Preliminary Response is filed as Paper 9.

² A public version of the Preliminary Reply is filed as Paper 14.

³ A public version of the Preliminary Sur-reply is filed as Paper 18.

IPR2021-01073 Patent 8,977,571 B1

For the reasons set forth below, upon considering the briefing and the evidence of record, we determine that the information presented in the Petition establishes a reasonable likelihood that Petitioner will prevail with respect to at least one of the challenged claims. Accordingly, we institute *inter partes* review on all of the challenged claims based on all of the grounds identified in the Petition.

B. Real Parties in Interest

Petitioner identifies itself as the only real party in interest. Pet. 3. Patent Owner identifies itself as the only real party in interest. Paper 5 (Patent Owner's Mandatory Notices), 2.

C. Related Matters

The parties identify *United Services Automobile Association v. PNC Bank N.A.*, No. 2:20-cv-00319-JRG (E.D. Tex.) ("the Texas case") as a litigation in which Patent Owner is asserting, *inter alia*, the '571 patent. Pet. 3; Paper 5, 2. Patent Owner also identifies *Mitek Systems, Inc. v. United Services Automobile Association*, Case No. 2:20-cv-00115-JRG (E.D. Tex.) as a proceeding involving the '571 patent. Paper 5, 2. Patent Owner represents that this case was dismissed and currently is on appeal to the United States Court of Appeals for the Federal Circuit. *Id.* at 2–3.

The parties also identify various post-grant proceedings involving the '571 patent and other related patents. Pet. 3–4; Paper 5, 3. This includes (1) a covered business method ("CBM") proceeding filed by Wells Fargo in which we denied institution (*Wells Fargo Bank, N.A. v. United Services Automobile Ass* 'n, CBM2019-00004) ("Wells Fargo CBM"), (2) an IPR proceeding filed by Wells Fargo in which we found the claims not

IPR2021-01073 Patent 8,977,571 B1

unpatentable in a Final Written Decision (*Wells Fargo Bank, N.A. v. United Services Automobile Ass'n*, IPR2019-01082) ("Wells Fargo IPR"), and (3) an IPR proceeding filed by Mitek Systems in which we exercised our discretion to deny institution (*Mitek Systems, Inc. v. United Services Automobile Ass'n*, IPR2020-00975 ("Mitek IPR")). *See* Paper 5, 3;

D. The '571 Patent

The '571 patent is titled "Systems and Methods for Image Monitoring of Check During Mobile Deposit." Ex. 1001, code (54). Figure 1 of the '571 patent is reproduced below.

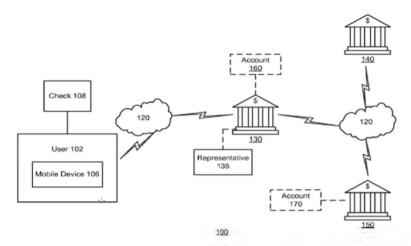


Figure 1 above illustrates a system "in which example embodiments and aspects may be implemented." *Id.* at 2:43–45. As shown in Figure 1, system 100 includes an account owner (user 102) and financial institutions 130, 140, 150 (e.g., banks), communicating with each other via networks 120 (e.g., the Internet). *Id.* at 2:45–52, 3:4–22. User 102 may deposit check 108 in account 160, and financial institution 130 may process and clear check 108. *Id.* at 3:10–12. For example, after endorsing check 108, user 102 uses mobile device 106 that includes a camera to convert check 108 into

IPR2021-01073 Patent 8,977,571 B1

a digital image by taking a picture of the front and/or back of check 108. *Id*. at 3:45–48.

The '571 patent recognizes that "depositing a check typically involves [a payee] going to a local bank branch and physically presenting the check to a bank teller." Ex. 1001, 1:22–24. Thus, "[t]o reduce such burdens for the payee, systems and methods have been developed to enable the remote deposit of checks." *Id.* at 1:24–26. The '571 patent states:

For example, the payee may capture a digital image of a check using a mobile device. The financial institution may then receive from the payee the digital image of the check. The financial institution may then use the digital image to credit funds to the payee.

Id. at 1:26–30. However, the '571 patent recognizes that "such a technique requires the efficient and accurate detection and extraction of the information pertaining to a check in the digital image," and that "[c]apturing a digital image at a mobile device that allows for subsequent detection and extraction of the information from the digital image is difficult." Id. at 1:26–35. In addition, the '571 patent recites that electronically exchanging a check image requires the image to be in "Check 21 compliant format." Id. at 12:16–17. The '571 patent explains that:

The Check Clearing for the 21st Century Act (or Check 21 Act) is a United States federal law that allows the recipient of a paper check to create a digital version, thereby eliminating the need for further handling of the physical document. The Check 21 standard for electronic exchange is defined in the standard DSTU X9.37-2003 ("X9.37"). It is a binary interchange format.

Id. at 12:19–25. The '571 patent discloses an invention wherein:

IPR2021-01073 Patent 8,977,571 B1

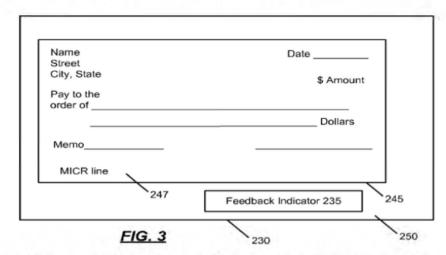
An image of a check that is in the field of view of a camera is monitored prior to the image of the check being captured. The camera is associated with a mobile device. The monitoring may be performed by the camera, the mobile device, and/or a financial institution that is in communication with the mobile device. When the image of the check in the field of view passes monitoring criteria, an image may be taken by the camera and provided from the mobile device to a financial institution. The check may be deposited in a user's bank account based on the image.

Id. at 1:38-47 (emphases added).

The '571 patent explains that "[t]o increase the likelihood of capturing a digital image of the check 108 that may be readable and processed such that the check 108 can be cleared, the image is monitored for compliance with one or more monitoring criteria, prior to the image of the check 108 being captured." Ex. 1001, 3:54–58 (emphasis added). The '571 patent further states that "[a]n application may monitor whether the check 108 is sufficiently within the frame of the camera and has a high enough quality for subsequent processing." Id. at 3:61–64 (emphases added); see also id. at 4:17–22 ("By ensuring that the image of the check passes monitoring criteria during pre-image capture monitoring, the number of nonconforming images of checks is reduced during presentment of the images to a financial institution for processing and clearing." (emphasis added)); 7:52–57; 8:45–49; 10:6–13; 12:9–14; 13:38–40 ("Compliance with the monitoring criteria is intended to ensure that the image of the check is suitable for one or more processing tasks.").

IPR2021-01073 Patent 8,977,571 B1

Figure 3 of the '571 patent is reproduced below.



As shown in Figure 3 above, image 230 comprises check image 247, background image 250, feedback indicator 235, and edge 245, which separates check image 247 from background image 250. Ex. 1001, 6:63–7:2. Image 230 may be generated by a mobile device with a camera and provided in the field of view of the camera prior to and during image capture of the check. *Id.* at 6:65–67, 7:3–5.

According to the '571 patent, one of the monitoring criteria may be based on the positioning of check 108 in image 230. Ex. 1001, 7:29–30. The positioning of check 108 in image 230 may be compared with an alignment guide. *Id.* at 7:38–41. The alignment guide may be a bounding rectangle, horizontal and/or vertical bars, or parallel lines. *Id.* at 7:59–62. For example, "aligning the check 108, thereby passing this monitoring criterion, means enclosing the check 108 within the bounding rectangle." *Id.* at 7:62–65. If check 108 is outside the alignment guide in image 230, feedback is generated and provided to user 102 regarding this monitoring

IPR2021-01073 Patent 8,977,571 B1

criterion with instruction for moving check 108 or the camera in order to align check 108 properly in the field of view. *Id.* at 7:65–8:3.

The '571 patent also discloses that "[i]n an implementation, the results of the monitoring may indicate that the camera and/or the check should be repositioned and/or the light source should be adjusted prior to an image capture in order to capture an image of the check that may be processed properly, e.g., to have the data from the check obtained without error from the image, so that that check can be cleared." Id. at 15:43–49 (emphasis added). The '571 patent explains that "feedback based on the results may be generated and provided visually and/or aurally to the user via the camera and/or the mobile device" and that "the feedback may be provided if the image fails to pass the monitoring criteria." *Id.* at 15:50–53.

E. Illustrative Claims

Of the challenged claims, claims 1 and 9 are independent. Claims 2–6 depend from claim 1, and claims 10, 12, and 13 depend from claim 9. Claim 1 is illustrative and reproduced below:

- 1. [1-pre] A non-transitory computer-readable medium comprising computer-readable instructions for depositing a check that, when executed by a processor, cause the processor to:
- [1a] monitor an image of the check in a field of view of a camera of a mobile device with respect to a monitoring criterion using an image monitoring and capture module of the mobile device;
- [1b] capture the image of the check with the camera when the image of the check passes the monitoring criterion; and
- [1c] provide the image of the check from the camera to a depository via a communication pathway between the mobile device and the depository.

IPR2021-01073 Patent 8,977,571 B1

Ex. 1001, 21:5-17

F. Prior Art and Asserted Grounds

Petitioner asserts that claims 1–6, 9, 10, 12, and 13 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. § ⁴	Reference(s)/Basis
1-3, 6, 9, 10, 13	103(a)	Acharya, ⁵ Luo ^{6, 7}
4, 5	103(a)	Acharya, Luo, Nepomniachtchi ⁸
12	103(a)	Acharya, Luo, Yoon9

Petitioner also relies on the testimony of Dr. Todd Mowry. Ex. 1002 (Declaration of Dr. Mowry in support of Petition).

⁴ The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Because the application which issued as the '571 patent was filed before March 16, 2013, we apply the pre-AIA version of the statute. See Ex. 1001, codes (21), (22).

⁵ US 8,768,836 B1, issued on July 1, 2014 (Ex. 1003).

⁶ CN 1897644A, published Jan. 17, 2007 (Ex. 1004). Exhibit 1004 consists of both original published Chinese patent application and an English translation. All cites are to the English translation.

⁷ Our rules require each page of an exhibit to be numbered in sequence. 37 C.F.R. § 42.63(d)(2)(i). Petitioner did not do so. **Petitioner shall refile the exhibit with a copy that complies with Rule 42.63**. When citing this exhibit, we cite to the pages sequentially, starting with the cover page. We do not use the native pagination, which repeats.

⁸ US 2009/0185241 A1, published July 23, 2009 (Ex. 1016).

⁹ US 2007/0262148 A1, published Nov. 15, 2007 (Ex. 1005).

IPR2021-01073 Patent 8,977,571 B1

ANALYSIS

A. Legal Standards

In *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), the Supreme Court set out a framework for assessing obviousness under 35 U.S.C. § 103 that requires consideration of four factors: (1) the "level of ordinary skill in the pertinent art," (2) the "scope and content of the prior art," (3) the "differences between the prior art and the claims at issue," and (4) if in evidence, "secondary considerations" of non-obviousness such as "commercial success, long-felt but unsolved needs, failure of others, etc." *Id.* at 17–18. "While the sequence of these questions might be reordered in any particular case," *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 407 (2007), the U.S. Court of Appeals for the Federal Circuit has repeatedly emphasized that "it is error to reach a conclusion of obviousness until all those factors are considered," *WBIP*, *LLC v. Kohler*, 829 F.3d 1317, 1328 (Fed. Cir. 2016).¹⁰

B. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. "The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry." *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). The "person having ordinary skill in the art" is a hypothetical construct, from whose vantage

¹⁰ Because neither party address objective evidence of non-obviousness, we focus solely on the first three *Graham* factors.

IPR2021-01073 Patent 8,977,571 B1

point obviousness is assessed. *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

Factors pertinent to a determination of the level of ordinary skill in the art include "(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696–97 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). "Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case." *Id.*

Petitioner argues that a person having ordinary skill in the art "would have had a bachelor's degree in electrical engineering, computer science, computer engineering, or equivalent field, and at least two years of prior experience with image processing or scanning technology involving transferring and processing of image data to and at a server." Pet. 20 (citing Ex. 1002 ¶ 41). Petitioner further argues that "[a] person with additional education or additional industrial experience could still be of ordinary skill in the art if that additional aspect compensates for a deficit in one of the other aspects of the requirements stated above." *Id.* at 20–21 (citing Ex. 1002 ¶ 41).

For purposes of this Decision, Patent Owner uses Petitioner's formulation of the person of ordinary skill in the art. Prelim. Resp. 33.

IPR2021-01073 Patent 8,977,571 B1

Accordingly, for purposes of this Decision, we adopt Petitioner's proposed formulation of the level of ordinary skill in the art, except that we delete the qualifier "at least" to eliminate vagueness as to the amount of practical experience. The qualifier expands the range indefinitely without an upper bound, and thus precludes a meaningful indication of the level of ordinary skill in the art.¹¹

C. Claim Construction

We apply the same claim construction standard used in the federal courts, in other words, the claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under the *Phillips* standard, the "words of a claim 'are generally given their ordinary and customary meaning," which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips*, 415 F.3d at 1312–13.

Petitioner proposes the construction of various terms. Pet. 21–25. For all of the terms except for "feedback . . . regarding the image of the check with respect to the monitoring criterion" as recited in dependent claim 2, Petitioner proposes using "the constructions urged by [Patent Owner] in the co-pending district court litigation or as the parties agreed." *Id.* For the

¹¹ If Patent Owner proposes a different level of ordinary skill in the art in its Response, the parties should address whether there are any material differences between the two proposals and what impact, if any, the different levels of ordinary skill have on the obviousness analysis.

IPR2021-01073 Patent 8,977,571 B1

"feedback" limitation, Petitioner argues that no further construction is necessary. *Id.* at 24–25.

Patent Owner disagrees with Petitioner's proposed formulation of the "feedback" limitation recited in dependent claim 2. Prelim. Resp. 34–35. Specifically, Patent Owner argues that a person having ordinary skill in the art "would have understood the term 'feedback . . . regarding the image of the check with respect to the monitoring criterion' to mean instructions to the user regarding actions to take in order to satisfy one or more monitoring criteria based on analysis of the monitoring criteria by the system." *Id.* at 34.

Because no express construction is needed for our decision, we do not construe any of the claim limitations. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that "we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

We note that the district court rejected Patent Owner's proposed construction of the "feedback" limitation recited in dependent claim 2 and, instead, agreed with Petitioner that the term needed no further construction beyond its plain and ordinary meaning. Ex. 1034 (Claim Construction Memorandum Opinion and Order), 56–59. If Patent Owner continues to pursue its proposed construction in the Response, Patent Owner should address the district court's claim construction.

IPR2021-01073 Patent 8,977,571 B1

D. Discretionary Denial – Serial Petitions

The AIA was "designed to establish a more efficient and streamlined patent system that will improve patent quality and limit unnecessary and counterproductive litigation costs." Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019) ("CTPG"), 56 (citations omitted). The Board has recognized these goals of the AIA, but also "recognize[d] the potential for abuse of the review process by repeated attacks on patents." *General Plastic Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19, 16–17 (PTAB Sept. 6, 2017) (precedential in relevant part).

In *General Plastic*, the Board articulated a list of non-exclusive factors to be considered in determining whether to exercise discretion under § 314(a) to deny a petition:

- 1. whether the same petitioner previously filed a petition directed to the same claims of the same patent;
- 2. whether at the time of filing of the first petition the petitioner knew of the prior art asserted in the second petition or should have known of it;
- 3. whether at the time of filing of the second petition the petitioner already received the patent owner's preliminary response to the first petition or received the Board's decision on whether to institute review in the first petition;
- 4. the length of time that elapsed between the time the petitioner learned of the prior art asserted in the second petition and the filing of the second petition;

¹² Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

IPR2021-01073 Patent 8,977,571 B1

- 5. whether the petitioner provides adequate explanation for the time elapsed between the filings of multiple petitions directed to the same claims of the same patent;
 - 6. the finite resources of the Board; and
- 7. the requirement under 35 U.S.C. § 316(a)(11) to issue a final determination not later than 1 year after the date on which the Director notices institution of review.

General Plastic at 16 (citing NVIDIA Corp. v. Samsung Elec. Co., IPR2016-00134, Paper 9 at 6–7 (PTAB May 4, 2016)). In our analysis below, we address each of these factors. Both Wells Fargo and Mitek previously filed petitions challenging claims of the '571 patent: the Wells Fargo CBM, the Wells Fargo IPR, and the Mitek IPR. See Paper 5, 3; Prelim Resp. 5–7. Patent Owner argues that some of the General Plastic factors weigh against institution by virtue of their application to the Wells Fargo IPR and CBM, while others weigh against institution by virtue of their application to the Mitek IPR. Prelim. Resp. 5–10. For example, for factor 1, Patent Owner argues that Mitek, but not Wells Fargo, has a significant relationship with Petitioner, and for factor 3, Patent Owner argues that Petitioner used the Wells Fargo IPR, but not the Mitek IPR, as a roadmap for the Petition. Id. at 5–7 (factor 1), 8–9 (factor 3).

1. Factor 1: Whether the Same Petitioner Previously Filed a Petition Directed to the Same Claims of the Same Patent

There is no dispute that Petitioner has not previously filed a petition directed to the '571 patent. Nevertheless, "our application of the *General Plastic* factors is not limited solely to instances when multiple petitions are filed by the same petitioner. Rather, when different petitioners challenge the same patent, we consider any relationship between those petitioners when

IPR2021-01073 Patent 8,977,571 B1

weighing the *General Plastic* factors." *Valve Corp. v. Elec. Scripting Prods., Inc.*, IPR2019-00062, Paper 11 at 9 (PTAB. Apr. 2, 2019) (precedential). Factor 1 might weigh against institution if there is a "significant relationship" between Petitioner and Mitek. *Id.* at 10.

Patent Owner bases its arguments for this factor on (1) the relationship between Mitek and Petitioner (they have a Common Interest Agreement), (2) Petitioner filing its Petition after the decisions in the other three proceedings, (3) Petitioner being aware of the '571 patent and Patent Owner's infringement allegations before any of the petitions challenged the '571 patent, and (4) all of the past petitions. Prelim. Resp. 5–7. In making this argument, Patent Owner relies on *Valve*. *Id.*; *see also* PO Prelim. Surreply 4–5 (discussing why *Valve* applies).

Petitioner argues "this case is devoid of facts supporting Valve's rationale." Pet. Prelim. Reply 4. According to Petitioner, in *Valve*, "at the time the earlier-filed petitioner (HTC) filed an IPR petition, the later-filed petitioner (Valve) was a *co-defendant* of HTC in the *same* district court litigation, both being accused of infringement based on *Valve's product*." *Id.* (citing *Valve*, Paper 11 at 2–3, 9–10). Petitioner further notes that in *Valve*, "at the time HTC filed its IPR petition, Valve and HTC had a 'significant relationship . . . with respect to Patent Owner's *assertion* of the [] patent' (*id.* at 10) and that justified imputing HTC's IPR petition to Valve." *Id.* Petitioner further argues that was not the case in this proceeding: "At the time Mitek filed its IPR petition, neither Mitek nor Petitioner was accused of infringement; Mitek and Petitioner did not have a

IPR2021-01073 Patent 8,977,571 B1

[Common Interest Agreement]; and Petitioner had no reason to believe that they would be accused of infringement." Pet. Prelim. Reply 5.

With regard to the relationship between Petitioner and Mitek,

Petitioner concedes that its products incorporate Mitek's technology and that

"certain aspects of the infringement allegations [asserted against it by Patent

Owner in the Texas case] implicate Mitek's software," prompting Petitioner

and Mitek to enter into the Common Interest Agreement. Pet. Prelim. Reply

2. However, even if we were to find a significant relationship between

Mitek and Petitioner and weigh this factor against institution, as we explain

below, Patent Owner does not contend that Petitioner used the Mitek IPR as
a roadmap for the Petition. 13

Patent Owner has not argued, let alone established, a sufficient relationship between Petitioner and Wells Fargo. *See* Prelim. Resp. 5–7. Accordingly, factor 1 weighs strongly against exercising our discretion to deny institution as to the Wells Fargo IPR. ¹⁴

2. Factor 2: Whether at the Time of Filing of the First Petition the Petitioner Knew of the Prior Art Asserted in the Second Petition or Should Have Known of It

Patent Owner argues that because one reference is an issued United States patent and the other is a Chinese patent cited in the Mitek IPR,

¹³ As explained below, Patent Owner only argues that Petitioner used the Wells Fargo IPR as a roadmap for the Petition. Prelim. Resp. 8–9.

¹⁴ For some factors, Patent Owner only refers to the Wells Fargo IPR. *See* Prelim. Resp. 8–9. For others, Patent Owner refers to both the Wells Fargo CBM and the Wells Fargo IPR. *See id.* at 10. We only refer to the Wells Fargo IPR in our conclusions, that encompasses, where appropriate, both the Wells Fargo CBM and Wells Fargo IPR.

IPR2021-01073 Patent 8,977,571 B1

Petitioner could have located the cited references with reasonable diligence. Prelim. Resp. 7–8. Patent Owner further argues that "[b]ecause PNC knew about the infringement allegations relating to the '571 Patent prior to the earlier petitions, and because PNC does not dispute that the references could have been found with reasonable diligence, this factor favors denying institution." PO Prelim. Sur-reply 5.

Petitioner argues that because Patent Owner had not yet accused Petitioner of infringing the '571 patent when the Mitek IPR was filed, it had no reason to perform any prior art search. Pet. Prelim. Reply 5.

Patent Owner argues that Petitioner was aware of claims of the '571 patent as early as a November 2019 jury verdict in a trial against Wells Fargo. PO Prelim. Sur-reply 5 (citing Ex. 2002, 3). However, Patent Owner does not allege Petitioner was aware of infringement allegations against Petitioner. Thus, Patent Owner offers no persuasive explanation why Petitioner should have been aware of Acharya and Luo at the time of the filing of Mitek's petition, and we see none. Thus, factor 2 weighs against exercising our discretion to deny the Petition based on the Mitek IPR.

As to the Wells Fargo IPR, Patent Owner does not allege that Petitioner was aware of or should have been aware of prior art by virtue of those proceedings and we see no reason why Petitioner should have been aware. Prelim. Resp. 7–8. Thus, this factor weighs against exercising our discretion to deny the Petition based on the Wells Fargo IPR.

IPR2021-01073 Patent 8,977,571 B1

3. Factor 3: Whether at the Time of Filing of the Second Petition the Petitioner Already Received the Patent Owner's Preliminary Response to the First Petition or Received the Board's Decision on Whether to Institute Review in the First Petition

Patent Owner argues Petitioner used the Final Written Decision in the Walls Fargo IPR as a roadmap. Prelim. Resp. 8–9. Specifically, Patent Owner argues that Petitioner uses a secondary reference (Luo) to fill in the holes found in the prior decision. *Id.* Patent Owner further argues that Factor 3 is not limited to proceedings by parties in relationship to Petitioner. PO Prelim. Resp. 5–6.

Petitioner argues that it did not use the petition in the Mitek IPR as a roadmap and Patent Owner does not argue otherwise. Pet. Prelim. Reply 5. Petitioner further argues that because Patent Owner does not argue that Petitioner has a significant relationship with Wells Fargo, consideration of the Wells Fargo IPR is "improper." *Id.* at 5–6.

Based on the timing, Petitioner could have used the Final Written
Decision in the Wells Fargo IPR as a guide. In fact, as Patent Owner points
out (PO Prelim. Sur-reply 6), Petitioner, in rebutting Patent Owner's
argument under 35 U.S.C. § 325(d), argues how its allegations are
distinguishable from those found not persuasive in the Wells Fargo IPR
Final Written Decision. Pet. Prelim. Reply 8. We conclude that, prior to its
Petition, Petitioner had received Board decisions (an institution decision and
a final written decision) in the Wells Fargo IPR. Thus, factor 3 weighs in
favor of exercising our discretion to deny the Petition in light of the Wells
Fargo IPR.

IPR2021-01073 Patent 8,977,571 B1

Patent Owner does not allege, with specificity, that Petitioner used the Mitek IPR as a roadmap for its Petition. Prelim. Resp. 8–9. Thus, this factor is neutral as to whether we should exercise our discretion to deny the Petition in light of the Mitek IPR.

4. Factor 4: The Length of Time that Elapsed Between the Time the Petitioner Learned of the Prior Art Asserted in the Second Petition and the Filing of the Second Petition

Factor 5: Whether the Petitioner Provides Adequate Explanation for the Time Elapsed Between the Filings of Multiple Petitions Directed to the Same Claims of the Same Patent

Patent Owner argues that "[j]ust as in *Valve*, Petitioner does not dispute that it 'could have found the prior art asserted in its Petition through the exercise of reasonable diligence at or around the time of [the earlier] petition." Prelim. Resp. 10 (citing *Valve*, Paper 11, 14). Patent Owner further argues that because "the Petition relies only on the same references from prior IPR proceedings," the large number of references on the face of the '571 patent is not an excuse. PO Prelim. Sur-reply 6.

Petitioner argues that the Texas court proceeding involves nine different patents and that "Petitioner has been diligent in defending against USAA's claims in the district court and preparing IPR petitions in parallel, including reviewing over 800 references cited on the face of the '571 patent to ensure that references used herein are non-cumulative." Pet. Prelim. Reply 6.

Petitioner has provided some excuse for the delay—namely the nine patents asserted against it. However, Petitioner does not identify when it first became aware of potential infringement issues associated with '571

IPR2021-01073 Patent 8,977,571 B1

patent or when it began working on its Petition. Given the limited nature of the excuse, we find these factors to be neutral with regard to both the Mitek IPR and the Wells Fargo IPR.

5. Factor 6: The Finite Resources of the Board

Factor 7: The Requirement under 35 U.S.C. § 316(a)(11) to Issue a Final Determination Not Later Than 1 Year after the Date on Which the Director Notices Institution of Review

Patent Owner argues that there have been four attacks against the '571 patent spread out over a three-year time period with overlapping references and substantially similar arguments. Prelim. Resp. 10; PO Prelim. Sur-reply 6.

Petitioner argues that "[u]nder USAA's *Valve* theory, the only relevant prior proceeding is Mitek's IPR (*see* Factor 3) and it was denied institution *without any consideration of the merits*. Thus, there is significant value to the Board's review of the '571 Patent." Pet. Prelim Reply 6.

With regard to the Mitek IPR, we did not consider the merits of Mitek's petition. Thus, with regard to the Mitek IPR, there is no duplication or efficiency concerns. Additionally, any trial in the present proceeding could be resolved within the one-year statutory timeframe. Therefore, this factor weighs against exercising our discretion to deny institution with respect to the Mitek IPR.

With regard to the Wells Fargo IPR, that proceeding reached a final written decision and, thus, constituted a significant investment of Board resources. Factors 6 and 7 weigh marginally in favor of exercising our

IPR2021-01073 Patent 8,977,571 B1

discretion to deny the Petition, at least where the Wells Fargo IPR is concerned.

6. Conclusion

In analyzing Patent Owner's arguments, we are concerned that Patent Owner improperly shifts its analysis between two separate sets of prior petitions, arguing some factors for the Wells Fargo IPR and others for the Mitek IPR. In weighing the various factors, we have considered the arguments directed to the Wells Fargo IPR separately from those directed to the Mitek IPR.

We have considered the circumstances and facts before us in view of the *General Plastic* factors. Because our analysis is fact driven, no single factor is determinative of whether we exercise our discretion to deny institution under § 314(a). Considering the *General Plastic* factors as part of a holistic analysis, we are not persuaded that the interests of the efficiency and integrity of the system would be best served by invoking our authority under 35 U.S.C. § 314(a) to deny institution.

E. Discretionary Denial – Parallel Proceedings

Patent Owner argues that we should exercise our discretion and deny institution based on a trial in the Texas case scheduled for April 18, 2022. *See* Prelim. Resp. 10–13.

Under § 314(a), the Director has discretion to deny institution of an IPR. See Cuozzo Speed Techs., LLC v. Lee, 136 S. Ct. 2131, 2140 (2016) ("[T]he agency's decision to deny a petition is a matter committed to the Patent Office's discretion."); Harmonic Inc. v. Avid Tech., Inc., 815 F.3d

IPR2021-01073 Patent 8,977,571 B1

1356, 1367 (Fed. Cir. 2016) ("[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.").

In *NHK*, the Board denied institution relying, in part, on § 314(a) because the parallel district court proceeding was scheduled to finish before the Board reached a final decision. *NHK Spring Co. v. Intri-Plex Techs.*, *Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (precedential) (Decision on Institution). "*NHK* applies to the situation where the district court has set a trial date to occur earlier than the Board's deadline to issue a final written decision in an instituted proceeding." *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 3 (PTAB Mar. 20, 2020) (precedential) (Order). When determining whether to exercise discretion to deny institution under *NHK* due to an earlier trial date, we consider the following factors ("*Fintiv* factors"):

- 1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
- 2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
- 3. investment in the parallel proceeding by the court and the parties;
- 4. overlap between issues raised in the petition and in the parallel proceeding;
- 5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
- 6. other circumstances that impact the Board's exercise of discretion, including the merits.
- *Id.* at 6. "These factors relate to whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial

IPR2021-01073 Patent 8,977,571 B1

date in the parallel proceeding." *Id.* In evaluating these factors, we take "a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Id.* (citing CTPG, 58). We address the *Fintiv* factors below.

1. Factor 1: Whether a Stay Exists or Is Likely to Be Granted if a Proceeding Is Instituted

Patent Owner argues that "Petitioner offers no evidence that Judge Gilstrap would grant a stay if an IPR is instituted." Prelim. Resp. 11 (citing Pet. 83–84).

Because neither party has requested a stay pending this proceeding, we determine that Factor 1 is neutral. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15 at 12 (PTAB May 13, 2020) (informative) (Institution Decision) (holding that "[t]his factor does not weigh for or against discretionary denial" when neither party requested a stay).

2. Factor 2: Proximity of the Court's Trial Date to the Board's Projected Statutory Deadline

Patent Owner argues that the trial in the Texas case is scheduled to begin on April 18, 2022. Prelim Resp. 11 (citing Ex. 2004). Patent Owner argues that is nine months before the expected deadline for a final written decision in this proceeding. *Id*.

Petitioner argues that there is "significant uncertainty over the trial date" due to multiple trials being scheduled for the same date. Pet. 84.¹⁵

¹⁵ Petitioner's argument is based on an earlier trial date. Subsequent to the Petition being filed, the trial date was changed. *See* Ex. 2004 (Second Amended Docket Control Order). There is no evidence in the record that multiple trials are scheduled for the new date.

IPR2021-01073 Patent 8,977,571 B1

The proximity factor in *Fintiv* asks us to evaluate our discretion in light of trial dates that have been set in parallel litigations. *See Fintiv*, at 3, 5, 9. Because the trial in the district court proceeding is scheduled approximately nine months before the due date for the Final Written Decision, even if there are some delays, the district court proceeding is likely to result in a trial in advance of our statutory due date. Accordingly, this factor weighs in favor of exercising our discretion to deny. *Id.* at 9.

3. Factor 3: Investment in the Parallel Proceeding by the Court and Parties

If, at the time of the institution decision, the district court has issued substantive orders related to the challenged patent, such as a claim construction order, this fact weighs in favor of denial. *See Fintiv*, Paper 11 at 9–10. On the other hand, if the district court has not issued such orders, this fact weighs against discretionary denial. *Id.* at 10. A *Markman* hearing in the Texas case took place on November 10, 2021, and the Texas court issued a Claim Construction Memorandum Opinion and Order on November 22, 2021. Ex. 1034.

Patent Owner argues that "the 'additional investment of time and resources by the District Court and the parties' occurring 'after institution but before our final decision,' also favors denial." Prelim. Resp. 12 (citing *Bentley Motors Ltd. v. Jaguar Land Rover Ltd.*, No. IPR2019-01539, Paper 16, at 9-10 (PTAB. Oct. 2, 2020)).

Petitioner argues that "[t]he parties have not completed fact or expert discovery, much less completed the briefing of a dispositive invalidity motion on the '571 patent." Pet. 83.

IPR2021-01073 Patent 8,977,571 B1

Under *Fintiv*, we consider only the work performed as of the institution decision:

The Board also has considered the amount and type of work already completed in the parallel litigation by the court and the parties at the time of the institution decision. Specifically, if, at the time of the institution decision, the district court has issued substantive orders related to the patent at issue in the petition, this fact favors denial. Likewise, district court claim construction orders may indicate that the court and parties have invested sufficient time in the parallel proceeding to favor denial. If, at the time of the institution decision, the district court has not issued orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution under NHK.

Fintiv, Paper 11, 9–10 (emphases added). Accordingly, we only consider what has transpired as of today and not what happens between now and the district court trial.

There is limited, if any, evidence regarding the stage of discovery in the Texas case. However, given that the Texas court has issued a claim construction ruling, we find that the parties and the Texas court have invested at least some resources toward resolving issues that we might be asked to resolve in this proceeding. In arguing that factor 4 favors denial, Patent Owner argues that "[b]y the time the Board issues an institution decision, dispositive motions also will be fully briefed." PO Prelim. Surreply 2 (citing Ex. 2014 (Third Amended Docket Control Order in Texas case), at 3). Thus, this factor weighs in favor of exercising our discretion to deny the Petition.

IPR2021-01073 Patent 8,977,571 B1

4. Factor 4: Overlap Between Issues Raised in the Petition and in the Parallel Proceeding

"Petitioner stipulates that if this IPR is instituted, it will not advance the grounds that are raised or reasonably could have been raised in this IPR in the co-pending district court proceeding, eliminating any overlap between the IPR and the co-pending district court proceeding." Pet. 83. Petitioner also represents that it has made a similar stipulation in a second proceeding involving a related patent. Pet. Prelim. Reply 7. This type of stipulation is often called a *Sotera*-type stipulation. *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 19 (PTAB Dec. 1, 2020) (Institution Decision) (precedential).

Patent Owner argues that Petitioner's stipulation would not have a meaningful impact because similar references are being used to challenge the validity of a related patent with similar claim limitations. Prelim. Reply 12–13. Patent Owner also argues that "Petitioner's election of prior art for trial in the district court proceeding also includes a 'system' reference as part of every asserted combination for the '571 patent, in an apparent attempt to defeat its own stipulation by asserting grounds that Petitioner will argue technically could not 'have been raised in this IPR.'" *Id.* at 13 (citing Ex. 2013 (Defendant's Supplemental Election of Prior Art), 2); *see also* PO Prelim. Sur-reply 1–2. Patent Owner further argues that the stipulation will not be effective because by the time the Board issues this decision, briefing on dispositive motions will have been completed. PO Prelim. Sur-reply 2–3 (citing *Cisco Sys., Inc. v. Estech Sys., Inc.*, IPR2021-00329, Paper 13 (July 6, 2021)).

IPR2021-01073 Patent 8,977,571 B1

We are not persuaded by Patent Owner's argument regarding the scope of the stipulation. We leave it to the district court to determine the scope of the stipulation and how it applies to any pending motions before the district court.

We are also not persuaded by Patent Owner's arguments regarding the timing of the stipulation. Specifically, Patent Owner relies on the following argument quoting from Cisco: the Board "distinguished Sotera because there 'relatively limited investment in the parallel proceeding to date,' had occurred, and thus 'factor [4] weighs strongly in favor of exercising our discretion to deny institution' despite the presence of a *Sotera* stipulation." PO Prelim. Sur-reply 3 (alteration Patent Owner's). However, Patent Owner's alteration to add "[4]" in its quote of Cisco is inaccurate and misleading. Rather, the Cisco case found factor 3, "investment," not factor 4, to weigh strongly in favor of exercise of discretion. Cisco, Paper 13 at 13; see also Samsung Elecs. Co. v. Acorn Semi, LLC, IPR2020-01183, Paper 17 at 38–45 (PTAB Feb. 10, 2021) (instituting with *Sotera* type stipulation when Final Written Decision due 10 months after trial date). Contrary to Patent Owner's implication, the Board held the exact opposite: "In Sotera, a similar stipulation 'mitigate[d] any concerns' raised by the overlapping issues before the district court. Sotera, Paper 12 at 19. As in Sotera, this factor weighs strongly in favor of not exercising discretion to deny institution under 35 U.S.C. § 314(a). *Id.*" Cisco, Paper 13 at 13.

Considering that the Petitioner has agreed to be bound by a stipulation that is substantively the same as the stipulation addressed in *Sotera*, this

IPR2021-01073 Patent 8,977,571 B1

factor weighs strongly against discretionary denial. *Sotera*, IPR2020-01019, Paper 12 at 19.

5. Factor 5: Whether the Petitioner and the Defendant in the Parallel Proceeding Are the Same Party

Because Petitioner is the defendant in the district court proceeding, this factor somewhat favors exercising our discretion. *Fintiv I*, at 13–14.

6. Factor 6: Other Circumstances that Impact the Board's Exercise of Discretion, Including the Merits

Patent Owner argues that "Petitioner's arguments are both substantively weak and repetitive of past failed challenges, Factor 6 weighs heavily in favor of discretionary denial." Prelim. Resp. 13.

We disagree. As discussed above, we do not find Petitioner's arguments weak. To the contrary, based on the preliminary record to date, Petitioner has made a strong showing. Additionally, as discussed below, we find that the prior art is not duplicative of prior art previously considered by the Office.

Accordingly, we find Factor 6 weighs against discretionary denial. *See Sand Revolution*, Paper 24 at 13 ("We determine, on this preliminary record, that Petitioner has set forth a reasonably strong case for the obviousness of most challenged claims. Thus, this factor weighs in favor of not exercising discretion to deny institution under 35 U.S.C. § 314(a).").

7. Balancing the Fintiv Factors

We have considered the circumstances and facts before us in view of the *Fintiv* factors. Because our analysis is fact driven, no single factor is determinative of whether we exercise our discretion to deny institution under § 314(a). Considering the *Fintiv* factors as part of a holistic analysis, we are

IPR2021-01073 Patent 8,977,571 B1

not persuaded that the interests of the efficiency and integrity of the system would be best served by invoking our authority under 35 U.S.C. § 314(a) to deny institution.

F. Discretionary Denial – 325(d)

1. Legal Standard

Patent Owner urges us to exercise our discretion to deny institution of trial under 35 U.S.C. § 325(d). Prelim. Resp. 14–22. Under § 325(d), we have discretion to deny a petition that presents the same or substantially the same prior art or arguments as previously presented to the Office. In evaluating whether the factual predicate under § 325(d) is met, we consider a number of non-exclusive factors, as set forth in *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (Institution Decision) (precedential as to Section III.C.5, first paragraph) ("the *Becton Dickinson* factors"):

- (a) the similarities and material differences between the asserted art and the prior art involved during examination;
- (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
- (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
- (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;
- (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and

IPR2021-01073 Patent 8,977,571 B1

(f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson, IPR2017-01586, Paper 8 at 17-18.

In performing an analysis under § 325(d), "the Board uses the following two-part framework:

(1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims. . . . If, after review of [Becton, Dickinson] factors (a), (b), and (d), it is determined that the same or substantially the same art or arguments previously were presented to the Office, then factors (c), (e), and (f) relate to whether the petitioner has demonstrated a material error by the Office.

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8, 10 (PTAB Feb. 13, 2020) (Institution Decision) (precedential) (footnote omitted). Consequently, we first turn to an analysis of Becton-Dickinson factors (a), (b), and (d) to determine whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office.

2. Part One of the Advanced Bionics Analysis

Becton Dickinson factors (a), (b), and (d) require us to determine, respectively: (a) "the similarities and material differences between the asserted art and the prior art involved during examination;" (b) "the cumulative nature of the asserted art and the prior art evaluated during

IPR2021-01073 Patent 8,977,571 B1

examination," and (d) "the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art." *Becton, Dickinson*, IPR2017-01586, Paper 8 at 17.

a) Acharya

Patent Owner argues that Acharya is substantially the same as Acharya '843,¹⁶ which was submitted on an Information Disclosure Statement during the prosecution of the '571 patent, and Acharya '436,¹⁷ which was considered in the Wells Fargo IPR. Prelim. Resp. 16. Specifically, Patent Owner argues that "Acharya is substantially the same as Acharya '436/'843 for purposes of the Petition" because Figures 1–3 are identical and the text in Acharya relied on by Petitioner corresponds to "teachings in Acharya '436/'843 and arguments considered in [the Wells Fargo IPR]." *Id.* at 16–19. Patent Owner also argues that, although "Petitioner's expert declaration (although not the Petition itself) includes a passing statement that Acharya '843 'does not include critical disclosures

¹⁶ US 2005/0267843 to Acharya (Ex. 1021). Acharya is a continuation-in-part of a parent of Acharya '843. *Compare* Ex. 1001, code (63) ("Continuation-in-part of application No. 09/506,434 filed on Feb. 18, 2000."), *with* Ex. 1021, code (62) ("Division of application No. 09/506,434, filed on Feb. 18, 2000.").

¹⁷ WO 01/6143 A2 to Acharya (Ex. 2005). Acharya '436 is a PCT application of the common parent application (App. No. 09/506,434) of both Acharya and Acharya '843. *Compare* Ex. 2005, code (30) ("*Priority Data*: 09/506,434 18 February 2000 (18.02.2000) US), *with* Ex. 1001, code (63) ("Continuation-in-part of application No. 09/506,434 filed on Feb. 18, 2000.") *and* Ex. 1021, code (62) ("Division of application No. 09/506,434, filed on Feb. 18, 2000.").

IPR2021-01073 Patent 8,977,571 B1

relied upon in this Petition, including the use of handheld mobile devices to capture check images," he does not provide "an explanation for this conclusory statement" and "it is irreconcilable with the Petition itself." *Id.* at 19. Patent Owner appears to argue that the disclosure of a Remote Customer Terminal ("RCT") in Acharya '843 and Acharya '436 is a disclosure of a wireless handheld device having a camera. PO Prelim. Surreply 8.

Petitioner argues that Acharya was not before the examiner during the prosecution of the '571 patent. Pet. 85. Petitioner further argues that Acharya is not identical to either Acharya '843 or Acharya '436. Pet. Prelim. Reply 8. Specifically, Petitioner argues that "claim 1 of the '571 Patent requires 'a camera of a mobile device,' and *unlike Acharya* '843/'436, Acharya discloses a 'wireless handheld device' having a 'camera.'" *Id.* (citing Pet. 33).

There is no dispute that Acharya was not considered during the prosecution of the '571 patent or during any of the previous post-grant proceedings challenging the patentability of the claims of the '571 patent.

We also find that Acharya is not substantially the same as either Acharya '843 or Acharya '436. Petitioner relies on Acharya's teaching that "the RCT is located at home, and comprises a digital camera, or a personal computer or wireless handheld device, such as a Blackberry(R) or Palm Treo R, having digital imaging capabilities such as an attached image scanner or a digital camera." Ex. 1003, 3:1–4 (emphasis added), cited by Pet. 33 (reason to combine); see also Pet. 33–39 (discussing reason to combine). As argued in the Petition, Acharya's teaching of using a wireless

IPR2021-01073 Patent 8,977,571 B1

handheld device is critical to Petitioner's reasoning for combining Luo's teaching to those of Acharya. *See* Pet. 33–39. Because the critical language of Acharya relied on by Petitioner is not located in Acharya '843 or Acharya '436, Acharya is not substantially the same as either Acharya '843 or Acharya '436

b) Luo

Petitioner argues that Luo was not previously considered by the Office during the prosecution of the '571 patent. Pet. 85. Petitioner further argues that "Luo is non-cumulative over Yoon because Luo includes material disclosures missing in Yoon." Pet. Prelim. Reply 8.

Patent Owner has a section of its Preliminary Response entitled "Petitioner Presents Substantially the Same Arguments for Luo as the Office has Twice Considered For Yoon." Prelim. Resp. 20. Although the section discusses how Yoon and members of the same patent family of Nepomniachtchi were previously considered by the Office, nowhere in that section does Patent Owner argues that Luo is substantially the same as Yoon or Nepomniachtchi.

Accordingly, neither Luo nor a reference with substantially the same teaching as Luo was previously before the Office.

3. Conclusion

Because we find that the evidence of record demonstrates that *Becton-Dickinson* factors (a), (b), and (d) have not been satisfied, our analysis ends at this point, and we need not proceed to step two of the *Advanced Bionics* framework. *See Advanced Bionics*, IPR2019-01469, Paper 6 at 8. We consequently decline to exercise our discretion to deny institution either for

IPR2021-01073 Patent 8,977,571 B1

the ground based exclusively on Acharya and Luo or for the remaining grounds that rely in part on Acharya and Luo.

G. Real Parties in Interest

A petition may be considered only if it "identifies all real parties in interest." 37 C.F.R. § 312(a)(2). Petitioner identifies only itself as the real party in interest. Pet. 3. Patent Owner contends that Mitek Systems, Inc., is a real party in interest that Petitioner failed to name. Prelim. Resp. 22–28.

Whether a non-party must be identified as a real party in interest in a proceeding is a highly fact-dependent question that is handled on a case-by-case basis. *Ventex Co., Ltd. v. Columbia Sportswear N. Am., Inc.*, IPR2017-00651, Paper 148 at 6 (PTAB Jan. 24, 2019) (precedential). According to the Federal Circuit:

Determining whether a non-party is a "real party in interest" demands a flexible approach that takes into account both equitable and practical considerations, with an eye toward determining whether the non-party is a clear beneficiary that has a preexisting, established relationship with the petitioner. Indeed, the Trial Practice Guide . . . suggests that the agency understands the "fact-dependent" nature of this inquiry, explaining that the two questions lying at its heart are whether a non-party "desires review of the patent" and whether a petition has been filed at a nonparty's "behest."

Applications in Internet Time, LLC v. RPX Corp., 897 F.3d 1336, 1351 (Fed. Cir. 2018) ("AIT") (quoting Trial Practice Guide, 77 Fed. Reg. 48,756, 48,759 (Aug. 14, 2012)); accord CTPG, 13–14 (Nov. 2019); RPX Corp. v. Applications in Internet Time, LLC, IPR2015-01750, Paper 128 (PTAB Oct. 2, 2020) (Remand Decision) (precedential).

IPR2021-01073 Patent 8,977,571 B1

As an initial matter, the parties agree that Petitioner could have named Mitek as a real party in interest without triggering a statutory bar under 35 U.S.C. § 315(b). Prelim. Resp. 25; Pet. Prelim. Reply 1–2. In this circumstance, Petitioner argues, we need not address whether Mitek is an unnamed real party in interest. Pet. Prelim. Reply 1–2 (citing *SharkNinja v. iRobot Corp.*, IPR2020-00734, Paper 11 at 18 (PTAB Oct. 6, 2020) (Institution Decision) (precedential)). *SharkNinja* explained that it is not necessary to conduct the "extensive analysis" necessary to determine whether a party should have been named as a real party in interest "where there is no allegation that the failure to name the purported RPI results in time bar, estoppel, or anything else material to the case." *SharkNinja*, Paper 11 at 19–20.

Patent Owner argues that Petitioner fails to identify Mitek as a real party in interest. Prelim. Resp. 22–28. Although Patent Owner concedes that we will generally not consider the failure to name a real party in interest when, as in this case, the omitted party is not barred, Patent Owner argues that we should do so in this case because Mitek was "purposefully omitted [] to gain some advantage." *Id.* at 25 (citing *SharkNinja*, Paper 11 at 19); *see also* PO Prelim. Sur-reply 7. Specifically, Patent Owner argues that Petitioner failed to identify Mitek because, if Mitek had been identified, that "would be tantamount to an admission that the Board should exercise its discretion to deny [Petitioner's] petitions." Prelim. Resp. at 25–26.

SharkNinja holds that the Board need not consider whether an unnamed party is a real party in interest when the addition of that party "would not create a time bar or estoppel under 35 U.S.C. § 315."

IPR2021-01073 Patent 8,977,571 B1

SharkNinja, Paper 11 at 18. In reaching that conclusion, the Board recognized that, even if the omitted party was an unnamed real party in interest, "our jurisdiction to consider a petition does not require a 'correct' identification of all RPIs in a petition" and the petitioner would have been able to add the omitted party. Id. (citing Lumentum Holdings, Inc. v. Capella Photonics, Inc., IPR2015-00739, Paper 38 at 6 (PTAB Mar. 4, 2016) (precedential); Blue Coat Sys., Inc. v. Finjan, Inc., IPR2016-01444, Paper 11 at 10 (PTAB July 18, 2017); Mayne Pharma Int'l Pty. Ltd. v. Merck Sharp & Dohme Corp., 927 F.3d 1232, 1240 (Fed. Cir. 2019)). Because the failure to name a real party in interest in those circumstances does not bar the proceeding, not considering the real party in interest issue "better serves the interest of cost and efficiency." Id. at 20.

Patent Owner concedes the Petition would not be barred if Mitek was named as a real party in interest. Prelim. Resp. 25. Because Petitioner could update its Mandatory Notices to include Mitek as a real party in interest (*Lumentum Holdings*, Paper 38), the "the interest of cost and efficiency" demands that we not consider the issue. *SharkNinja*, Paper 11 at 20.

We are not persuaded by Patent Owner's argument that we should consider whether Mitek is a real party in interest because Petitioner intentionally omitted Mitek to gain an advantage. *See* Prelim. Resp. 22–28. We agree with Patent Owner that *SharkNinja* mentioned the petitioner's lack of bad faith: "there is no allegation or evidence that JS Global is barred or estopped from this proceeding, or that Petitioner purposefully omitted JS Global to gain some advantage." *SharkNinja*, Paper 11 at 20. However, Patent Owner has not sufficiently shown the Petitioner engaged in bad faith.

IPR2021-01073 Patent 8,977,571 B1

As discussed above, we do not exercise our discretion to deny pursuant to *General Plastic* and *Valve*, we see no other persuasive evidence that would lead us to conclude that Petitioner omitted Mitek as a real party in interest to gain an unfair advantage.

Moreover, even if we were to consider the issue, we would conclude that Mitek is not an unnamed real party in interest. Patent Owner contends that Petitioner employs Mitek's check capture software. Prelim. Resp. 2–3. Petitioner appears to confirm this, stating that "[Petitioner] provides its customers with a remote check deposit application developed by its contractor, NCR," and that "NCR developed [Petitioner's] application using its proprietary software, but also partly using software developed by Mitek." Pet. Prelim. Reply 2. Petitioner states that "certain aspects of the infringement allegations implicate Mitek's software." *Id*.

Patent Owner points out that Mitek has entered into common interest agreements with Petitioner and with Wells Fargo and that, collectively, Mitek, Wells Fargo, and Petitioner have filed 21 petitions against the '571 patent and six other patents owned by Patent Owner, with Petitioner's being the last petitions filed. Prelim. Resp. 23–24. As Patent Owner notes (*id.* at 24), the Common Interest Agreement between Mitek and Petitioner states, in part,

Ex. 2006, 1. In light of the Common

Interest Agreement, Patent Owner argues that "there is every indication that

IPR2021-01073 Patent 8,977,571 B1

Mitek is providing [Petitioner] with substantial assistance," as further evidenced by Petitioner disclosing four Mitek employees as potential witnesses in the Texas case. ¹⁸ PO Prelim. Sur-reply 8; *see also id.* at 5 ("[I]n its SEC disclosures, Mitek describes the litigation between USAA and PNC under a heading of 'Third-Party Claims Against *Our Customers*" and "further vowing to 'vigorously defend the right of its end-users to use its technology." (quoting Ex. 2015, 19–20)). Petitioner responds that the Common Interest Agreement

and, thus, does not evidence "the requisite preexisting, established relationship with the Petitioner." Prelim. Reply 2–3 (citing Ex. 2006, 4–5).

Patent Owner further argues that Mitek identified the '571 patent and this proceeding in its filings with the United States Securities and Exchange Commission (SEC) and stated that it "continues to believe that its products do not infringe the Subject Patents [including the '571 patent] and will vigorously defend the right of its end-users to use its technology." Prelim. Resp. 27; Ex. 2001 (Mitek Systems, Inc., June 30, 2021, Form 10-Q), 29–30. 19

Patent Owner further argues that a panel of this Board denied institution of the Mitek IPR after finding a relationship between Mitek and Wells Fargo that was significant enough for discretionary denial under

¹⁸ Patent Owner does not state who the witnesses are or what the topics of their testimony might be.

¹⁹ We cite to the page numbers added by Patent Owner to the lower right corners of the exhibit pages.

IPR2021-01073 Patent 8,977,571 B1

General Plastic and *Valve*, although Patent Owner concedes that the panel did not reach whether Wells Fargo was an unnamed real party in interest. Prelim. Resp. 28.

In light of these contentions, Patent Owner argues that "Mitek is clearly interested in challenging the validity of the '571 Patent and perceives itself as a beneficiary of such challenges." *Id.*

At most, Patent Owner's evidence shows that Petitioner and Mitek have a customer-supplier relationship and that both might benefit in some way from a cancellation of claims of the '571 patent. Mitek's statements in SEC filings reflect its concern that it might have exposure when its customers are sued for patent infringement. Although the Common Interest Agreement

, we see no evidence to support Patent Owner's

, we see no evidence to support Patent Owner's contention that "there is every indication that Mitek is providing [Petitioner] with substantial assistance" in this proceeding. PO Prelim. Sur-reply 8. Petitioner represents that it and Mitek "have had no communications relating to the IPR[]." Pet. Prelim. Reply 4. Patent Owner's allegation (PO Prelim. Sur-reply 8), without more, that Petitioner disclosed four Mitek employees as potential witnesses in the Texas case is consistent with identifying witnesses relevant to rebutting Patent Owner's infringement allegations, and does not necessarily show cooperation in an attempt to challenge the '571 patent.

The evidence of record is insufficient to conclude that Mitek is a real party in interest. *See RPX*, Paper 128 at 30–31 ("There is no dispute that RPX and Salesforce have a pre-existing relationship. It also is clear that

IPR2021-01073 Patent 8,977,571 B1

Salesforce, as a defendant in the underlying litigation, has an interest in and will benefit from an invalidation of the claims of the challenged patents. The inquiry does not end there, however. We agree with RPX that, if these facts alone were sufficient to require a finding that Salesforce is an RPI to this proceeding, the Federal Circuit would not have remanded this case for additional fact finding.").

Additionally, we must consider whether Petitioner can be said to be representing Mitek's interest in challenging the claims of the '571 patent after examining its relationship with Mitek. See RPX, Paper 128 at 31; AIT, 897 F.3d at 1353. We also must consider whether the Petition was filed at Mitek's behest. See RPX, Paper 128 at 32; AIT, 897 F.3d at 1351. We see no persuasive evidence that Petitioner is representing Mitek's interest or that it filed the Petition at Mitek's behest. Rather, the evidence suggests that Petitioner is representing its own interest as the defendant in the Texas case facing infringement liability, and Mitek stands to benefit in the same manner as any other party that might face infringement allegations from Patent Owner should one or more claims of the '571 patent be cancelled. We also consider whether Mitek controlled or could have exercised control over Petitioner's participation in this proceeding. See RPX, Paper 128 at 32–33. Petitioner states that "Mitek does not fund, direct, or control the IPR[]." Prelim. Reply. 4. Patent Owner does not contend otherwise, but instead argues that this is not relevant, despite RPX's guidance to consider such factors. We, therefore, see no other basis to conclude that Mitek is a real party in interest.

IPR2021-01073 Patent 8,977,571 B1

Having considered all the evidence of record and the parties' arguments, we find that Petitioner has shown that Mitek is not an RPI in this proceeding and we decline to deny the Petition on that basis.

H. Obviousness over Acharya and Luo

Petitioner argues that claims 1–3, 6, 9, 10, and 13 would have been obvious over Acharya and Luo. *See* Pet. 33–73. Based on the current record, we are persuaded that Petitioner has established a reasonable likelihood of prevailing on this asserted obviousness ground with respect to claims 1–3, 6, 9, 10, and 13.

1. Acharya

Acharya is entitled "System and Method for Electronic Deposit of a Financial Instrument by Banking Customers from Remote Locations by Use of a Digital Image" and is directed to a system in which a bank customer can deposit a financial instrument, such as a check, without physically transporting the item to a bank by the customer creating or using a digital image of the instrument. Ex. 1003, codes (54), (57), 1:18–31. Specifically, Acharya describes using RCT 100, which can be a digital camera or wireless handheld device having digital imaging capabilities such as an attached digital camera. *Id.* at code (57), 3:1–5, 4:14–31. The "image and/or other data of the financial instrument are transmitted from the RCT to the Bank of First Deposit (BOFD) where the data may be processed." *Id.* at code (57); *see also id.* at 5:42–6:42. Additionally, "BOFD system 110 may be connected to one or more check clearing systems 130 via a communication link 140. The check clearing systems may comprise for-profit clearing

IPR2021-01073 Patent 8,977,571 B1

houses 131, Federal Reserve banks 132, and local paying banks 134." *Id.* at 6:32-36.

To deposit the check, the banking customer logs on to BOFD system 110 from RCT 100, selects a "deposit" option from a menu of transaction options, and is prompted to deposit a financial instrument. *Id.* at 6:55–7:7 (Figure 2, steps 200–230). In response to a prompt for additional information (Figure 2, step 240), "the banking customer may submit the data taken from the financial instrument, along with the digital image of the financial instrument, to the BOFD system 110 for processing 250, and may receive acknowledgement from the BOFD system 110 that the transaction is being processed 260." *Id.* at 7:42–47. The banking customer may then receive a response indicating immediate provisional credit for the deposit (Figure 2, step 270). *Id.* at 8:4–8.

2. Luo

Luo is entitled "A Method and System for Capturing Images" and is directed to "a method and system for capturing images using a digital camera, especially (but not exclusively) a method and system for capturing images of documents such as business cards." Ex. 1004, code (54), 4. Luo notes that "today's digital cameras are often integrated into mobile phones, personal digital assistants (PDAs), and laptops," with the result that "people in business can use digital cameras incorporated into mobile phones to quickly and easily capture digital images of their business cards." *Id.* at 1. However, it is "unideal" when one "holds the business card in front of the camera lens with one hand, while holding the camera with the other hand when taking pictures," because of "variable factors such as the distance from

IPR2021-01073 Patent 8,977,571 B1

the lens to the business card, and the angle of the camera's image plane relative to the front of the business card," such that "the image resulted may contain defects such as projective distortion." *Id*.

Luo Figures 1 and 2 are reproduced below.

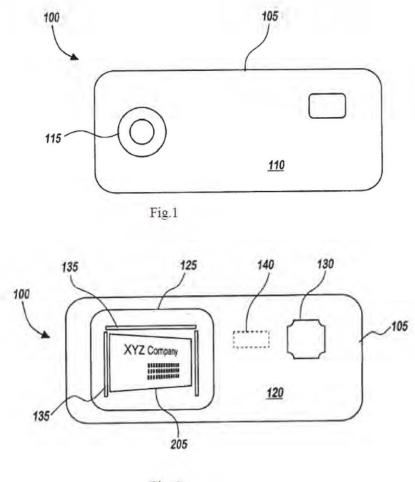


Fig. 2

Figure 1 "shows a schematic front view of a camera system" and Figure 2 "shows a schematic rear view of a camera system." Ex. 1004, 5. Specifically, Figure 1 shows camera system 100, which "includes a camera

IPR2021-01073 Patent 8,977,571 B1

housing 105 incorporating a front side 110 . . . [which] contains an image sensor 115 adapted to receive an image." *Id.* at 6. Figure 2 shows the back 120 of camera system 100, which "contains a preview window 125, which is suitable for displaying the image received by the image sensor 115." *Id.* "When the mode selection switch 130 is set to the document capture mode, the reference line 135 is displayed in the preview window 125." *Id.*

Luo describes how "[v]arious techniques may be used to indicate to the user that an appropriate number of reference lines 135 are substantially parallel to the respective straight edges 205 of the object depicted in the preview window 125." Ex. 1004, 9. "For example, an alarm composed of sounds, such as a clicking sound output from the camera system 100, may be provided." *Id.* Alternatively, "an image indicator may be displayed on the preview window 125" or "when the straight edge 205 displayed on the preview window 125 is substantially parallel to the corresponding reference line 135, the system 100 can automatically capture the selected image and provide the user with or without instructions." *Id.*

3. Analysis of Claim 1

a) Undisputed Limitations

The preamble²⁰ of claim 1 recites "[a] non-transitory computer-readable medium comprising computer-readable instructions for depositing a check that, when executed by a processor, cause the processor to."

²⁰ Petitioner proposes a construction of the preamble and treats it as limiting. Pet. 22, 40–43. Accordingly, we treat it as limiting. If either party contends the preamble is not limiting, the construction should be addressed in the Patent Owner's Response or Petitioner's Reply.

IPR2021-01073 Patent 8,977,571 B1

Ex. 1001, 21:6–8. Petitioner argues Acharya teaches the preamble. Pet. 40–43. Specifically, Petitioner directs our attention to RCT 100, which includes a central processing unit ("CPU") and memory which holds instructions for providing a check to a depository in a form sufficient to allow money to be credited to an account. *Id.* at 40–42. Petitioner further argues that the "instructions, when executed by a processor, cause the processor to perform certain steps including, for example, those provided below in elements [1a]–[1c] when combined with Luo." *Id.* at 42–43.²¹

Claim 1 further recites that the instructions cause the processor to "[1a] monitor an image of the check in a field of view of a camera of a mobile device with respect to a monitoring criterion using an image monitoring and capture module of the mobile device." Ex. 1001, 21:9–12. Petitioner argues that the combination of Acharya and Luo teaches this limitation. Pet. 43–53. As discussed below, Petitioner argues Luo teaches all of the elements of the limitation except for "the check," which is taught by Acharya. *Id*.

Petitioner argues that Luo teaches "monitor[ing] an image of the [object]." Pet. 43–45. Specifically, Petitioner argues the because Luo captures an image of a business card only when the edges of the business card are substantially parallel with reference lines 135, "Luo's system monitors the image in the preview window 125." *Id*.

²¹ Petitioner italicizes the names of prior art references. Those italics are omitted in this Decision.

IPR2021-01073 Patent 8,977,571 B1

Petitioner further argues that Luo teaches that the monitoring is done "with respect to a monitoring criteria." Pet. 45–49. Specifically, Petitioner argues that

Luo teaches monitoring whether a "straight edge 205" of an object whose image is being "displayed in the preview window 125 is substantially parallel to the corresponding reference line 135" and "only when the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135 can the image of the object be captured."

Id. at 46 (quoting Ex. 1004, 7). According to Petitioner, alignment with the reference lines is a "monitoring criterion." *Id.* at 46–49.

Petitioner further argues that Luo teaches that the "image" is "monitor[ed] . . . in a field of view of a camera of a mobile device." Pet. 49–51. Specifically, Petitioner argues that Luo teaches a camera system with image sensor 115 adapted to receive an image and a preview window that functions as a viewfinder to display the image in realtime. *Id*.

Petitioner further argues that Luo teaches "using an image monitoring and capture module." Pet. 51–52. Specifically, Petitioner argues that Luo teaches that image sensor 115 may "contain conventional lenses and optics, as well as digital image sensors, such as a charge coupled device (CCD) sensor, a CMOS sensor, and so on." *Id.* at 51 (emphasis omitted) (quoting Ex. 1004, 3). Petitioner also argues that "Luo teaches that 'the embodiments described herein may consist of one or more conventional processors and uniquely stored program instructions that control the operation of one or more processors." *Id.* (quoting Ex. 1004, 8). According to Petitioner, a person having ordinary skill in the art would "have recognized that the implementation details taught by Luo would apply to Acharya's 'digital

IPR2021-01073 Patent 8,977,571 B1

camera' RCT (EX1003, 4:18–20) as instructions (i.e., software) stored in memory and executed by the CPU 103." *Id.* at 51–52 (citing Ex. 1002 ¶ 104).

Petitioner further argues that Acharya teaches capturing the image of a "check." Pet. 52–53. According to Petitioner, a person having ordinary skill "would have found it obvious to combine Acharya and Luo to 'monitor an image of the check." *Id.* at 52 (citing Ex. 1002 ¶ 105).

Claim 1 further recites that the instructions cause the processor to "[1b] capture the image of the check with the camera when the image of the check passes the monitoring criterion." Ex. 1001, 21:13–14. Petitioner argues that the combination of Acharya and Luo teaches this limitation. Pet. 53–55. Specifically, Petitioner argues that Acharya "capture[s] the image of the check with the camera." Pet. 53. According to Petitioner, Acharya teaches "that 'the banking customer **captures the digital image of the financial instrument**' (EX1003, 3:12-13), 'e.g. a paper check' (*id.*, 1:23), 'by the digital camera' (*id.*, 3:13)." Pet. 53. Petitioner also argues Luo teaches that the image is captured "at or after the moment the image of the check passes the monitoring criterion." *Id.* at 53–54 (citing Ex. 1004, 6).

Claim 1 further recites that the instructions cause the processor to "[1c] provide the image of the check from the camera to a depository via a communication pathway between the mobile device and the depository." Ex. 1001, 21:15–17. Petitioner argues Acharya teaches this limitation. Pet. 55–57. Specifically, Petitioner argues RCT 100 communicates with BOFD system 100, a depository, via a direct communication link 120. *Id.* at 55–56. Petitioner also argues that a person having ordinary skill in the art would

IPR2021-01073 Patent 8,977,571 B1

understand that RCT 100 sends a copy of the check over communication link 120 to BOFD system 110. *Id.* at 56–57.

After reviewing Petitioner's arguments and information, including the Mowry Declaration (Ex. 1002), which Patent Owner does not address at this stage (*see* Prelim. Resp.),²² we are persuaded that Petitioner sufficiently demonstrates, for purposes of this Decision, that the combination of Acharya and Luo teaches each limitation recited in claim 1.

- b) Reason to Combine Acharya and Luo
 - (1) Petitioner's Arguments

Petitioner argues that Acharya teaches using RCT 100 to capture the digital image of a financial instrument, such as a bank check, and the images are suitable for extracting data such as 'MICR line, RTN, account number, amount of financial instrument, [and] date of financial instrument." Pet. 33 (quoting Ex. 1003, 2:53–55) (citing Ex. 1003, 3:1–14; Ex. 1002 ¶¶ 72–73). Petitioner also argues, however, that Acharya does not teach "how its system determines that an image is suitable for capture or how to implement the customer prompt for capturing such an image." *Id.* According to Petitioner, a person having ordinary skill in the art "would have been motivated to find teachings from the prior art to fill these implementation details." *Id.* at 33–34 (citing Ex. 1002 ¶¶ 73–74).

Although Patent Owner does not dispute that the Acharya and Luo together teach each of the limitations recited in claim 1, Patent Owner argues that a person having ordinary skill in the art would not have combined the references. *See* Prelim. Resp. 36–48. We address that argument separately in the following subsection.

IPR2021-01073 Patent 8,977,571 B1

Petitioner further argues that Luo teaches a "'method and system' for determining that an 'image is clearer and more accurate' for performing 'optical character recognition . . . with high accuracy' by monitoring whether 'the straight edge 205 shown in the preview window 125 is substantially parallel to the corresponding reference line 135.'" *Id.* at 34 (quoting Ex. 1004, 7). Petitioner also argues that Luo teaches that, "[a]fter this monitoring criterion is met, 'instructions' are provided to the user 'before capturing the image of the object.'" *Id.* (quoting Ex. 1004, claims 5, 11). Petitioner also argues Luo provides implementation details. *Id.* (citing Ex. 1002 ¶¶ 74–75).

Petitioner further argues that a person having ordinary skill in the art would have incorporated Luo's teaching into Acharya. Pet. 34–37. Specifically, Petitioner argues that because Luo teaches that many environments are not ideal for capturing high-quality images, a person having ordinary skill in the art would have been motivated to modify Acharya by "using the monitoring, feedback, and capture techniques described in Luo to improve captured images." *Id.* at 34. According to Petitioner, a person having ordinary skill in the art would have understood that Luo's "guidance feature enables 'an optical character recognition process performed on a [captured] text image, with high accuracy' and Luo's feedback to the customer assists the user in capturing images." *Id.* (quoting Ex. 1004, 7). Petitioner also argues that a person having ordinary skill in the art "would have recognized that these techniques were directly applicable to check image capture to predictably increase the likelihood of obtaining images suitable for 'convert[ing] machine printed characters on

IPR2021-01073 Patent 8,977,571 B1

... the digital image of the financial instrument to electronic text." *Id.* (quoting Ex. 1003, 4:67-5:2) (citing Ex. 1002 ¶¶ 76–77); *see also id.* at 35–37 (discussing how the modification amounted to "[a]pplying] a known technique to a known device ready for improvement to yield predictable results." (quoting Manual of Patent Examing Procedure § 2141)).

Petitioner further argues that a person having ordinary skill in the art would have had a reasonable expectation of success in implementing Acharya's RCT 100 using Luo's camera system. Pet. 37–39. Petitioner argues that both Acharya and Luo teach storing instructions in memory and having those instruction executed by a processor. *Id.* at 37–38 (citing Ex. 1003, 4:63–65; Ex. 1004, 8). Petitioner also argues that because Luo teaches that its systems can be incorporated in mobile phones and personal digital assistants, a person having ordinary skill in the art "would have recognized that the implementation details taught by *Luo* would apply to Acharya's 'telephone, **digital camera**, ... **PDA or** . . . wireless handheld device' RCT (EX1003, 4:18–20) as instructions (i.e., software) stored in memory and executed by the CPU 103." *Id.* at 38 (citing Ex. 1002 ¶ 81); *see also id.* at 38–39 (discussing how both references are implemented on similar devices).

Petitioner further argues that the "teachings of Acharya and Luo are directed to similar types of documents." Pet. 39. According to Petitioner, "Luo is directed to 'documents' including 'rectangular, triangular, or other shaped pieces of paper . . . or other objects having straight edges 205 and a surface' to 'make the optical character recognition of any text printed in the document effective and reliable." *Id.* (first quoting Ex. 1004, 1, then

IPR2021-01073 Patent 8,977,571 B1

quoting Ex. 1004, 6). Petitioner further argues that a person having ordinary skill in the art "would have recognized that Luo's technique can be applied to obtain paper check images suitable for optical character recognition with a reasonable expectation of success." *Id.* (citing Ex. 1002 ¶ 83).

(2) Patent Owner's Arguments

Patent Owner disputes Petitioner's assertions for three reasons. Prelim. Resp. 36–48.

First, Patent Owner argues that Petitioner fails to provide sufficient evidence that a person having ordinary skill in the art would have been motivated to combine Acharya with Luo to arrive at the claimed invention. Prelim. Resp. 37–38. Specifically, Patent Owner argues that "Petitioner identifies no evidence that Acharya has a projective distortion problem." *Id.* at 37. Accordingly, Patent Owner argues that "Petitioner fails to show a motivation to modify Acharya at all, much less a motivation to adopt the specific modifications presented in the Petition." *Id.* at 37–38 (citing *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 (Fed. Cir. 2000); *In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017)).

Second, Patent Owner argues Petitioner does not present sufficient evidence that a person having ordinary skill in the art would have modified Acharya to satisfy the monitoring and capturing element. Prelim. Resp. 38–42. Specifically, Patent Owner argues that "Petitioner's proposed modifications to Acharya extend well beyond Luo's solution of reference lines." *Id.* at 38–39. According to Patent Owner, the "monitoring and autocapture features of Luo . . . are additional and distinct from the 'reference line' that Petitioner argues would solve any projective distortion issue." *Id.*

IPR2021-01073 Patent 8,977,571 B1

at 39; *see also id.* at 39–40 (discussing differences between the reference lines and the monitoring and auto-capture features).

Patent Owner further argues that Petitioner's argument on how to implement a system that determines if an image is suitable for capture and how to prompt capture is conclusory. Prelim. Resp. 40–41. Patent Owner argues such details are "missing' because Acharya is a manual capture system that does not have these features." Id. at 41. According to Patent Owner, Petitioner's motivation is "entirely circular and legally insufficient." Id. (citing Unigene Labs., Inc. v. Apotex, Inc., 655 F.3d 1352, 1360 (Fed. Cir. 2011); In re Chaganti, 554 F. App'x 917, 922 (Fed. Cir. 2014) (nonprecedential)). Patent Owner also argues that "Petitioner offers no explanation as to why a [person having ordinary skill in the art] would look to Luo, in particular, to fill them in." Id. at 42 (citing 2Wire, Inc. v. TQ) Delta LLC, IPR2015-00247, Paper 19 at 11 (PTAB May 29, 2015)); see also id. ("The PTAB has previously recognized (in its Final Written Decision affirming the validity of these same challenged claims) that there is a distinction between a motivation to add an alignment guide and a motivation to turn a manual system into an autonomous monitoring and autonomous capturing system." (citing Wells Fargo Bank, N.A. v. United Services Automobile Ass'n, IPR2019-01082, Paper 41,²³ 45 (PTAB Nov. 24, 2020)).

Third, Patent Owner argues that Petitioner fails to weigh the drawbacks of the proposed combination against the alleged benefits. Prelim. Resp. 43–48; *see also id.* at 43 ("Petitioner also failed to consider significant

²³ Patent Owner incorrectly cites Paper 39.

IPR2021-01073 Patent 8,977,571 B1

drawbacks that would result from doing so and performs no weighing of the benefits and drawbacks." (citing *Arctic Cat Inc. v. Polaris Indus., Inc.*, 795 Fed. App'x. 827 (Fed. Cir. 2019))). Specifically, Patent Owner argues that Petitioner fails to address "whether adding to Acharya the collective set of Luo features, including auto-capture, would have been viewed by a [person having ordinary skill in the art] as *collectively* resulting in a better system of check imaging." *Id.* at 43. Patent Owner also argues that "the Petition does not engage with the fact that its proposed modification would eliminate the data entry feature of Acharya." *Id.* at 44; *see also id.* at 44–47 (discussing argument in detail). Patent Owner also argues that the proposed modification "would decrease Acharya's ability to recognize check information because, as described below, Luo's system 100's memory does not have vital software needed to recognize the various types of information on a check." *Id.* at 47; *see also id.* at 47–48 (discussing argument in detail).

(3) Our Analysis

Based on the current record, we are sufficiently persuaded that a person having ordinary skill in the art would have combined Luo's features relating to monitoring and capturing the image of a document with Acharya's RCT 100.

Luo teaches that one of the advantages associated with incorporating digital cameras into handheld devices such as mobile phones is the ability "to quickly and easily capture digital images of their business cards" and then "perform optical character recognition (OCR) on the digital images, and save the name, address, and other information printed on the business cards automatically in the contact file of their phones." Ex. 1004, 4. However,

IPR2021-01073 Patent 8,977,571 B1

Luo also identifies a significant issue with that feature: "many environments today for using digital cameras are not ideal for capturing high-quality images." *Id.* at 1. For example, Luo states that these unideal factors can result in images that "may contain defects such as projective distortion." *Id.*

To overcome that problem, Luo teaches an improved "method and system for capturing images of documents" such as business cards "which helps reduce projective distortion in the image." Ex. 1004, 4 (first quotation), code (57) (second quotation). In this system, "a preview image depicting a straight edge (205) and at least two reference lines (135) simultaneously present is displayed in a preview window (125) of the camera system (100), where each reference line (135) corresponds to a straight edge (205)." *Id.* at code (57). The system indicates to the user when the reference lines (135) are substantially parallel to the straightedges (205) of the document. *Id.* at 9. "The image of the object is captured only when the straight edge (205) shown in the preview window (125) is substantially parallel to the corresponding reference line (135)." *Id.* at code (57). The parties describes these features as monitoring, feedback, and capture, respectively. *See*, *e.g.*, Pet. 34–35; Prelim. Resp. 38–42.

Acharya involves a similar use of the same technology, but instead of capturing the image of business cards, Acharya takes the image of financial instruments, such as checks. Ex. 1003, 1:18–26; Ex. 1002 ¶¶ 82–83. Like Luo, Acharya teaches extracting data from the document being captured by the camera:

Software and/or hardware accessible at or through the RCT can "recognize" data in or on the digital image of the financial instrument. Such data could include data contained in the MICR

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IPR2021-01073 Patent 8,977,571 B1

line, RTN, account number, amount of financial instrument, date of financial instrument or any other characters present in or on the digital image of the financial instrument. Recognition can be made of such data, whether in human-visible or machine readable form.

Ex. 1003, 2:50–58. However, Acharya is silent on any method or system for insuring that the image is acceptable. Ex. 1002 ¶ 73; *see also* Prelim. Resp. 37. Based on the current record, because a person having ordinary skill in the art would have recognized that the difficulty in capturing acceptable images of documents using digital cameras, we are sufficiently persuaded that a person having ordinary skill would have wanted to incorporate a system such as Luo's which can monitor the image, provide feedback when the image is not acceptable, and capture the image when it is acceptable into Acharya. Ex. 1002 ¶¶ 76–77.

Contrary to Patent Owner's argument (Prelim. Resp. 37–38), it is of no moment that Acharya does not provide a motivation or discuss issues with acceptable images. In *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007), the Supreme Court held that, "if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill." 550 U.S. at 417. Thus, because the features of Luo improved the images of documents taken by digital camera in mobile devices, based on the current record, a person having ordinary skill in the art would have had a reason to modify other mobile devices having digital images to improve the quality of those images. *See id.* at 416 ("The combination of familiar elements

IPR2021-01073 Patent 8,977,571 B1

according to known methods is likely to be obvious when it does no more than yield predictable results."), 417 ("If a person of ordinary skill in the art can implement a predictable variation, § 103 likely bars its patentability.").

Based on the current record, we also disagree with Patent Owner's argument that Petitioner's motivation argument was limited to the reference lines. *See* Prelim. Resp. 38–42. Petitioner does not argue that a person having ordinary skill would have only modified Acharya to use Luo's reference lines; instead, Petitioner argues that a person having ordinary skill in the art would have implemented Luo's use of "monitoring, feedback, and capture techniques" with Acharya to "improve captured images." Pet. 35. Based on the current record, contrary to Patent Owner's argument, the combined features are integral to Luo's teaching. *See* Ex. 1004, code (57).

Based on the current record, we also do not agree with Patent Owner that Petitioner's arguments are conclusory and circular. *See* Prelim. Resp. 40–41. In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, it is insufficient to simply conclude that the combination would have been obvious without identifying any reason *why* a person of skill in the art would have made the combination. *Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017). "The question is not whether the various references separately taught components of the [] Patent formulation, but whether the prior art suggested the selection and combination achieved by the [] inventors." *Orexo AB v. Actavis Elizabeth LLC*, 903 F.3d 1265, 1273 (Fed. Cir. 2018). Arguments on the reason to combine must be supported by "some articulated reasoning with some

IPR2021-01073 Patent 8,977,571 B1

rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (citations omitted), *cited with approval in KSR*, 550 U.S. at 418.

Based on the current record, Petitioner has done just that. Petitioner identified an improvement in Luo and articulated sufficient reasons why a person having ordinary skill in the art would have combined the relevant teachings. See Ex. 1002 ¶¶ 72–84. The relevant testimony is neither conclusory—as it is supported by citation to the prior art references—nor is it circular. Rather, it provides detailed reasoning with citation to the record as to why a person having ordinary skill in the art would have combined the teachings. See id.

Based on the posture of the proceedings and the current record, we do not agree with Patent Owner's argument that Petitioner ignored potential drawbacks. *See* Prelim. Resp. 43–48. First, with regard to the posture of the proceedings, the case is in a preliminary state and Petitioner has not yet had the opportunity to respond to Patent Owner's arguments of potential drawbacks.

Second, it is unclear that Patent Owner has identified any drawbacks associated with the combination of Acharya and Luo. *See* Prelim. Resp. 43–48. Although Patent Owner raises potential issues associated with the implementation of Luo into Acharya, none of them appear to be drawbacks. *See id*. Rather, Patent Owner simply identifies issues that a person having ordinary skill in the art would need to address when combining the relevant teachings of each reference. *See id*.

IPR2021-01073 Patent 8,977,571 B1

Moreover, Patent Owner's arguments are based on the direct incorporation of memory and code from Luo to Acharya. However, the test for obviousness, however, "is not whether the features of a secondary reference can be bodily incorporated into the structure of the primary reference." *MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1294 (Fed. Cir. 2015) (quoting *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)). Rather, the question is "whether the claimed inventions are rendered obvious by the teachings of the prior art as a whole." *In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (en banc) (noting that whether one prior art reference can be incorporated into another is "basically irrelevant."). A person having an ordinary skill in the art is not an automaton, blindly copying software designed for reading business cards and applying them to checks. *See KSR*, 550 U.S. at 421.

c) Conclusion Regarding Claim 1

For the reasons set forth above, Petitioner has demonstrated, on this record, a reasonable likelihood of prevailing on its assertion that claim 1 is unpatentable over Acharya and Luo.

4. Analysis of Claims 2, 3, 6, 9, 10, and 13

Because Petitioner has demonstrated a reasonable likelihood of success in proving that at least one claim of the '571 patent is unpatentable, we institute on all grounds and all claims raised in the Petition. *See* 37 C.F.R. 42.108(a); *PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (indicating that a decision whether to institute an *inter partes* review "require[s] a simple yes-or-no institution choice respecting a petition, embracing all challenges included in the petition"). Therefore, at this stage

IPR2021-01073 Patent 8,977,571 B1

of the proceeding, it is not necessary for us to provide an assessment of every challenge in this ground, especially as Patent Owner has not presented any responsive argument beyond that addressed above for claim 1.

Nevertheless, we note that Petitioner provides detailed explanations supported by the testimony of Dr. Mowry and specific citations to the relevant references indicating where in the reference Petitioner argues the limitations of claims 2, 3, 6, 9, 10, and 13 are taught and why a person of ordinary skill in the art would have combined the various teachings of Acharya and Luo. *See* Pet. 58–73. Accordingly, at this stage of the proceeding, we are persuaded the information presented in the Petition establishes there is a reasonable likelihood that Petitioner would prevail on its assertion that claims 2, 3, 6, 9, 10, and 13 are unpatentable over Acharya and Luo.

I. Obviousness over Acharya, Luo, and Nepomniachtchi

Petitioner argues that claims 4 and 5 would have been obvious over Acharya, Luo, and Nepomniachtchi. Pet. 73–78. Based on the current record and for the reasons that follow, we are persuaded that Petitioner has established a reasonable likelihood of prevailing with respect to claims 4 and 5.

1. Nepomniachtchi

Nepomniachtchi is entitled "System for Mobile Imaging Capture and Processing of Documents" and is directed "to systems and methods for document image processing that enhances an image for data extraction from images captured on a mobile device with camera capabilities." Ex. 1016, code (54), ¶ 2. Relevant to this proceeding, Nepomniachtchi recites

IPR2021-01073 Patent 8,977,571 B1

prompting the user to take a picture of both the front and back of a check. *Id.* ¶ 78. Nepomniachtchi also recites prompting the user to take a second picture if the image quality is determined to be poor. *Id.* ¶ 62.

2. Analysis of Claim 4 and 5

As discussed above, because Petitioner has demonstrated a reasonable likelihood of success in proving that at least one claim of the '571 patent is unpatentable, we institute on all grounds and all claims raised in the Petition. Therefore, at this stage of the proceeding, it is not necessary for us to provide an assessment of every challenge raised by Petitioner, especially as Patent Owner has not presented any responsive argument directed to the additional limitations set forth in claims 4 and 5. *See* Prelim. Resp.

Nevertheless, we note that Petitioner provides detailed explanations supported by the testimony of Dr. Mowry and specific citations to the relevant references indicating where in the reference Petitioner argues the limitations of claims 4 and 5 are taught and why a person of ordinary skill in the art would have combined the various teachings of Acharya, Luo, and Nepomniachtchi. *See* Pet. 73–78. Accordingly, at this stage of the proceeding, we are persuaded the information presented in the Petition establishes there is a reasonable likelihood that Petitioner would prevail on its assertion that claims 4 and 5 are unpatentable over Acharya, Luo, and Nepomniachtchi.

J. Obviousness over Acharya, Luo, and Yoon

Petitioner argues that claim 12 would have been obvious over Acharya, Luo, and Yoon. Pet. 78–83. Based on the current record and for

IPR2021-01073 Patent 8,977,571 B1

the reasons that follow, we are persuaded that Petitioner has established a reasonable likelihood of prevailing with respect to claim 12.

1. Yoon

Yoon is entitled "Apparatus and Method for Photographing a Business Card in Portable Terminal" and is directed "to an apparatus and method for allowing a business card to be automatically photographed by detecting the boundary lines of the business card." Ex. 1005, code (54), ¶ 3. Relevant to this proceeding, Yoon recites that image brightness is one of the "unideal variable factors" that can lower the "probability of satisfactorily recognizing the business card in order to obtain the information contained in the business card." *Id.* ¶ 7. Yoon addresses this issue by monitoring image brightness when an image is captured by a terminal. *See id.* at Fig. 2.

2. Analysis of Claim 12

As discussed above, because Petitioner has demonstrated a reasonable likelihood of success in proving that at least one claim of the '571 patent is unpatentable, we institute on all grounds and all claims raised in the Petition. Therefore, at this stage of the proceeding, it is not necessary for us to provide an assessment of every challenge raised by Petitioner, especially as Patent Owner has not presented any responsive argument directed to the additional limitations set forth in claim 12. *See* Prelim. Resp.

Nevertheless, we note that Petitioner provides detailed explanations supported by the testimony of Dr. Mowry and specific citations to the relevant references indicating where in the reference Petitioner argues the limitation of claim 12 is taught and why a person of ordinary skill in the art would have combined the various teachings of Acharya, Luo, and Yoon.

IPR2021-01073 Patent 8,977,571 B1

See Pet. 78–83. Accordingly, at this stage of the proceeding, we are persuaded the information presented in the Petition establishes there is a reasonable likelihood that Petitioner would prevail on its assertion that claim 12 is unpatentable over Acharya, Luo, and Yoon.

CONCLUSION

Following § 314, we have determined that the totality of the information presented at this stage shows there is a reasonable likelihood that Petitioner would prevail with respect to at least one of the claims challenged in the Petition, and we institute on all grounds raised and all claims challenged in the Petition.

Our factual findings, conclusions of law, and determinations at this stage of the proceeding are preliminary, and based on the evidentiary record developed thus far. This is not a final decision as to the patentability of claims for which IPR is instituted. Our final decision will be based on the record as fully developed during trial.

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, an *inter partes* review of all challenged claims of the '571 patent is instituted with respect to all grounds set forth in the Petition;

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter* partes review of the '571 patent is hereby instituted commencing on the entry date of this Decision, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial;

FURTHER ORDERED that Petitioner shall refile Exhibit 1004 with a copy that complies with 37 C.F.R. § 42.63; and

IPR2021-01073 Patent 8,977,571 B1

FURTHER ORDERED that the parties agree upon and file, as a Paper, a redacted public version of this Decision within ten business days of the entry date of this Decision.

IPR2021-01073 Patent 8,977,571 B1

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> U.S. Patent No. 8,977,571 IPR2021-01073

CERTIFICATE OF SERVICE

Pursuant to the Board's Order dated January 24, 2022, I hereby certify that on February 7, 2022 I caused a true and correct copy of the foregoing materials:

• Public Version of Decision Granting Institution of *Inter Partes* Review to be served by electronic mail, as agreed to by the parties, upon the following:

USAA-IPRs@irell.com

By: / Jonathan P Knight/

Jonathan P. Knight

Reg. No. 69,866

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION ("USAA"), Patent Owner.

Case No. IPR2021-01073 Patent No. 8,977,571

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To be clear, this defect in Petitioner's argument is not based on an assumption that a POSA would need to bodily incorporate Luo's features into Acharya without alteration. Even assuming that a POSA would have made changes to Luo's technique to fit Acharya's system, such as adjusting the size/shape of the reference lines to correspond to checks rather than business cards, Luo still only teaches triggering automatic capture based on substantial parallelism between the edges of the document and the reference lines. EX1004, 6-7. That is also the only criteria for image capture that Petitioner relies upon and contends would be incorporated into the combination. Pet., 53-54.

C. Petitioner Fails to Show Adequate Motivation to Combine Acharya with Luo

When the Board addressed the issue of motivation at the institution stage, it preliminarily determined that a POSA could reasonably have been motivated to apply Luo's automatic capture process to Acharya in order to improve that system in the same way that it improved Luo's (i.e., improving the quality of those images by reducing the "perspective distortion" identified by Luo as an issue with images captured by handheld digital cameras). ID, 56-57. The Board also felt that, on the preliminary record, there was a dispute of fact requiring trial as to drawbacks that would dissuade a POSA from making the combination. ID, 58-59. The post-institution record shows a POSA would not have been so motivated.

> Case IPR2021-01073 Patent No. 8,977,571

First, Petitioner's own asserted references—Acharya, Nepomniachtchi, and ImageNet—show that the established method of remote check deposit in the art was to have the customer manually capture or otherwise obtain check images and provide the images and/or check data to the bank for processing. To the extent the images alone were inadequate for processing, those skilled in the art resolved these issues by correcting the images digitally at the bank's servers (e.g., as described in Nepomniachtchi as well as other check deposit art such as Blackson, EX2108) and/or obtaining check data directly from the customer rather than from the check image (e.g., as described in Acharya).

Indeed, everything that Petitioner contends would motivate a POSA to implement Luo's automatic capture technique is already addressed by Nepomniachtchi:

• Dr. Mowry contends that a POSA would have been "motivated to find teachings from the prior art" regarding how to determine that an image is suitable for extracting data such as "MICR line, RTN, account number, amount of financial instrument, [and] data of financial instrument." EX1002, ¶73-74. Nepomniachtchi discloses these details. EX1016, ¶56 (describing data that must be electronically read from the check for deposit); ¶78 (describing evaluating whether

> Case IPR2021-01073 Patent No. 8,977,571

the image quality is sufficient to read the data from the check and prompting the user to retake if necessary).

- Dr. Mowry contends that a POSA would have understood from Luo that images captured using digital cameras are not "high quality" and result in "defects such as projective distortion." EX1002, ¶76.

 Nepomniachtchi teaches how to detect and correct projective distortion in images captured by digital cameras. EX1016, ¶72-73 (describing process for "remov[ing] or decreasing the perspective distortion" in a captured image), ¶82 ("the server may clean up the image [by] performing auto-rotate, de-skew, perspective distortion correction, etc."); EX2116, 10:2-7 (admitting Nepomniachtchi teaches processing after the image is captured to reduce projective distortion).
- Dr. Mowry contends that a POSA would have implemented Luo's "monitoring, feedback, and capture techniques" to "obtain[] images suitable for image processing, which is desirable." EX1002, ¶76.

 Nepomniachtchi teaches obtaining images suitable for check deposit processing specifically and based on a manually captured image by the user, i.e., without using "monitoring, feedback, and capture techniques." EX1016, ¶62-78 (describing processes applied to a

Case IPR2021-01073 Patent No. 8,977,571

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Case IPR2021-01073 Patent No. 8,977,571

• Dr. Mowry concedes he has no evidence that Nepomniachtchi is any less effective than Luo at addressing projective distortion and blur. EX2116, 19:14-20:2, 21:19-22.

Meanwhile, Nepomniachtchi teaches that there are many other image quality factors that "may affect the quality of an image" and "may cause low accuracy when processing the image, for example, when processing one or more of the fields on a document," such as "out-of-focus images," "unequal contrast or brightness," or inadequate lighting, which Luo's technique does nothing to address. EX1016, ¶58-62.

Petitioner has presented no evidence that this established method of remote check deposit in the art was perceived as inadequate for addressing projective distortion or blur. To the contrary, Petitioner contends that a commercially successful, manual capture mobile check deposit system already existed in the prior art. Pet., 10-12 (describing Mitek ImageNet).¹¹ Indeed, the Board previously

¹¹ Dr. Mowry did not evaluate whether ImageNet (or any other remote deposit system in the industry) had issues with projective distortion or blur in captured check images. EX2116, 30:1-31:13. He also testified Acharya did not identify any problems with projective distortion or blur in its existing manual capture implementation. EX2116, 33:16-24.

Case IPR2021-01073 Patent No. 8,977,571

found that this manual capture approach (as reflected in Nepomniachtchi) "already provides a solution that addresses image distortions," including "(1) utilizing the user's judgment (e.g., placing the camera directly above the document, rather than at an angle, to avoid image distortion) for the pre-capturing analysis and "(2) performing the image quality analysis on the mobile device to quickly determine whether the image can be accepted, needs correction, or needs retaking while the user is still physically close to the document and before starting another task." EX2101, 49.

Petitioner's expert was asked if he had any actual evidence that the solutions for blur and projective distortion addressed in Nepomniachtchi were any less effective than Luo. He conceded he had none. EX2116, 19:14-20:2, 21:19-22.

Second, the alleged "problem" with digital camera imaging described in Luo—misalignment/distortion caused by incorrect positioning of the camera relative to the document—was already accounted for by the deposit processing algorithms employed in the art. In addition to the use of the user's judgment (in manual capture implementation) regarding the positioning of the camera precapture and the rapid feedback to the user regarding the acceptability of the image post-capture that the Board noted in Nepomniachtchi in the prior proceeding, Nepomniachtchi further taught a third solution to image distortions: "performing the correction processing to 'clean up the image by performing auto-rotate, de-

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Third, a POSA would have expected Luo's single-criterion automatic capture technique to be less effective and undesirably burden to the mobile processor implement in comparison to existing manual capture technique employed by Acharya and Nepomniatchichi, and Imagenet, and would have been discouraged from making the combination, particularly in view of the limited and uncertain benefits of doing so described above. EX2101, 56 ("[R]eplacing the user's judgment that is based on numerous factors, with an auto-capture system based solely on alignment, would not minimize the need for retaking the images, but would instead introduce additional errors."), 60 (adding "monitoring and auto-

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capture features" would "increase the burden on [the] mobile device and may lead to slower response times and user dissatisfaction").

Fourth, Luo teaches that its alignment guide technique can be applied with both a manual capture step and an auto-capture step. The Petition provides no explanation as to why, even if a POSA would be motivated to aid an alignment guide monitored by the processor, it would then choose to add auto-capture, which would strip away human ability to ensure that other criteria that are necessary for a successful deposit are satisfied.

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Petitioner identifies three references purportedly teaching remote check deposit in the prior art: Acharya (EX1003), Nepomniachtchi (EX1016), and Mitek ImageNet (EX1014). Each of these systems employed a "manual capture" approach where the customer captures check images using a camera and uploads those images and/or other check data to a bank system for deposit processing. *See*, *e.g.*, EX1003, 3:12-15 ("banking customer capture the digital image of the financial instrument by the scanner or the digital camera"); EX1016, [0078] ("device may prompt the user of the device to take a picture of the front of the document"); EX1014, 37-39 (illustrating manual capture process). These references all leave the decision of when to capture the image in the hands of the

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U.S. Patent No. 8,977,571 to Bueche, Jr. et al.

IPR Trial No. IPR2021-01073

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

> IPR2021-01073 Petitioner Reply

TABLE OF CONTENTS

I.	USAA'S ARGUMENTS THAT THE PETITION LACKS A MOTIVATION TO COMBINE ACHARYA AND LUO FAIL1			
	A.	The Final Written Decision in IPR2019-01082 is Inapposite to the Issues Presented in this IPR	2	
	В.	None of USAA's Merits Arguments Against the <i>Acharya/Luo</i> Combination Undercuts the Strong Motivation to Combine	4	
II.	USAA'S ARGUMENTS THAT <i>ACHARYA/LUO</i> LACKS AN "IMAGE MONITORING AND CAPTURE MODULE" FAIL		13	
	A.	USAA Identifies No Reason for the Board to Change Its Prior Claim Construction	13	
	В.	The District Court's Actual Construction Does Not Change the Obviousness Analysis	14	
	С.	USAA's Attempts to Mischaracterize the District Court's Construction Fail	16	
III.	"DE	A'S ARGUMENTS THAT ACHARYA/LUO LACKS THE POSITING A CHECK" AND "PASSES THE MONITORING	10	
	(CRT	FFRION" LIMITATIONS FAIL	19	

IPR2021-01073 Petitioner Reply

TABLE OF AUTHORITIES

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Allergan, Inc. v. Apotex Inc., 754 F.3d 952 (Fed. Cir. 2014)	28
Allgenesis Biotherapeutics Inc. v. Cloudbreak Therapeutics, LLC, IPR2020-01438, Paper 29 (February 15, 2022)	6
Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC, 825 F.3d 1373 (Fed. Cir. 2016)	12
Apple Inc. v. Corephotonics, Ltd., 861 Fed. Appx. 443 (Fed. Cir. 2021)	27
Arctic Cat Inc. v. Polaris Indus., 795 Fed. Appx. 827 (Fed. Cir. 2019)	11
Bicon, Inc. v. Straumann Co., 441 F.3d 945 (Fed. Cir. 2006)	22
Henny Penny Corp. v. Frymaster LLC, 938 F.3d 1324 (Fed. Cir. 2019)	11
Hewlett-Packard Co. v. Mustek Sys., Inc., 340 F.3d 1314 (Fed. Cir. 2003)	21
<i>In re Antor Media Corp.</i> , 689 F.3d 1282 (Fed. Cir. 2012)	27
In re Mouttet, 686 F.3d 1322 (Fed. Cir. 2012)	12
Intel Corp. v. Qualcomm Inc., 21 F.4th 784 (Fed. Cir. 2021)	12
Leapfrog Enters. v. Fisher-Price, Inc., 485 F.3d 1157 (Fed. Cir. 2007)	7
Mitek Systems., Inc. v. United Services Automobile Assoc'n, IPR2020-00975, Paper 20 (P.T.A.B Aug. 29, 2020)	14

IPR2021-01073 Petitioner Reply

Par Pharm., Inc. v. TWi Pharms., Inc., 120 F. Supp. 3d 468 (D. Md. Jul. 28, 2015)	26
Par Pharm., Inc. v. Twi Pharms., Inc., 773 F.3d 1186 (Fed. Cir. 2014)	13
Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc., 75 F.3d 1568 (Fed. Cir. 1996)	12
Texas Instruments Inc. v. U.S. Int'l Trade Comm'n, 988 F.2d 1165 (Fed. Cir. 1993)	22
Unwired Planet, LLC v. Google Inc., 841 F.3d 995 (Fed. Cir. 2016)	21
VTech Communications, Inc. v. Spherix Incorporated, IPR2014-01431, Paper 50 (P.T.A.B. Feb. 3, 2016)	16
Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17 (1997)	22
Wells Fargo Bank, N.A. v. United Services Automobile Assoc'n, CBM2019-00004, Paper 7 (P.T.A.B. Feb. 20, 2019)	14
Wells Fargo Bank, N.A. v. United Services Automobile Assoc'n, IPR2019-01082, Paper 17 (P.T.A.B Mar. 10, 2020)	14
Wells Fargo Bank, N.A. v. United Services Automobile Assoc'n, IPR2019-01082, Paper 41 (P.T.A.B. Nov. 24, 2020)	
Wells Fargo Bank, N.A. v. United Services Automobile Assoc'n, IPR2020-00092, Paper 7 (P.T.A.B. May 11, 2020)	

> IPR2021-01073 Petitioner Reply

As the Decision on Institution recognized, the Petition sets forth a textbook case of obviousness based on prior art that the Examiner did not have the benefit of reviewing at the time of issuance and supplies strong evidence in support of motivation to combine that prior art. USAA's Corrected Patent Owner Response ("POR") raises three categories of arguments, but none withstands scrutiny. This reply addresses each of USAA's arguments in turn.

I. USAA'S ARGUMENTS THAT THE PETITION LACKS A MOTIVATION TO COMBINE ACHARYA AND LUO FAIL¹

Acharya and Luo are a "strong" combination. Paper 20, 29. Acharya teaches check image capture and OCR for remote deposit, but does not provide implementation details for obtaining a suitable image. Luo fills that gap by teaching automatic capture (or "autocapture") of documents based on alignment with a guide in order to address projective distortion and obtain clear images suitable for OCR. Petition, 33-57. It states that its technique is useful for any rectangular pieces of paper (as checks are). Id. The Petition demonstrated a POSITA would have therefore been motivated to capture a check image using Luo's techniques when implementing Acharya's system. Id., 33-39. USAA's expert, Dr. Creusere

1

¹ USAA advances no additional arguments concerning combination with *Nepomniachtchi* or *Yoon*.

> IPR2021-01073 Petitioner Reply

conceded all of these points at his deposition. EX1037, 113:2-8 ("Acharya teaches that OCR can be performed at [a mobile device]"), 119:22-120:13 (Acharya "does not describe how [the] image was captured"), 88:12-20 ("correcting the [projective] distortion ... will make it easier to perform optical character recognition"). EX1036, ¶9.

Nevertheless, USAA alleges that there were drawbacks to combining *Luo*'s alignment monitoring and autocapture with *Acharya*'s mobile check deposit system. POR, 45-69. As explained below, each of USAA's arguments fails because it is based on misstatements regarding the prior art and the law. EX1036, ¶10.

A. The Final Written Decision in IPR2019-01082 is Inapposite to the Issues Presented in this IPR

USAA first argues that the Board's final written decision in IPR2019-01082 is determinative of this IPR. POR, 13-27. That argument fails for two reasons. EX1036, ¶11.

First, in the -01082 IPR, Wells Fargo failed to explain the need to modify certain non-mobile device embodiments of *Nepomniachtchi* to address projective distortion by substituting *Yoon*'s alignment guide, where *Nepomniachtchi* already taught that those embodiments included suitable techniques for addressing projective distortion. *Wells Fargo Bank, N.A. v. USAA*, IPR2019-01082, Paper 41, 14, 24-28 (P.T.A.B. Nov. 24, 2020). *See* Petition, 2. EX1036, ¶12.

> IPR2021-01073 Petitioner Reply

Wells Fargo's shortcoming has no applicability here because, as Dr. Creusere admitted, *Acharya* is *silent* as to the projective distortion problem that *Luo* solves. EX1037, 107:10-15. Thus, in contrast to *Nepomniachtchi/Yoon* in the -01082 IPR, *Acharya/Luo* does not require a POSITA to grapple with whether "to retain the existing [server-side] manual capture functionality of *Acharya*" (POR, 59) or to "replace manual capture ... with automatic capture" (*id.*, 66). Instead, implementing *Luo*'s alignment guide in *Acharya* was simply an application of a known technique to a known device ready for improvement. Petition, 35-36; EX1002, 34. EX1036, ¶¶13-14.

Moreover, in a subsequent institution decision, the Board determined that there *would* have been a motivation and that "a skilled artisan would have recognized the benefits of ensuring that a suitable image is captured in the first place [using *Yoon*'s alignment guide in *Nepomniachtchi*'s mobile device embodiments], rather than trying to deal with a poor image captured without checking quality." *Wells Fargo Bank, N.A. v. USAA*, IPR2020-00092, Paper 7, 38, 41 (P.T.A.B. May 11, 2020) (citation omitted).² The Board rejected USAA's arguments that parallel those

² IPR2020-00092 challenged a '571 patent family member that similarly claimed "monitor[ing] ... with respect to a monitoring criterion" and "captur[ing] ... when the image ... passes the monitoring criterion." EX1042, claim 1.

> IPR2021-01073 Petitioner Reply

in its POR here as "weak, unfounded, and unconvincing." *Id.*, 37. EX1036, ¶¶15-16.

B. None of USAA's Merits Arguments Against the Acharya/Luo Combination Undercuts the Strong Motivation to Combine

Next, USAA asserts various reasons it believes a POSITA would have been dissuaded from combining *Acharya* and *Luo*. None has merit. EX1036, ¶17.

First, USAA argues that Nepomniachtchi's teachings would have dissuaded a POSITA from implementing Luo's technique in Acharya, because "correcting the images digitally at the bank's servers" (POR, 46) was supposedly "the preferred approach to dealing with perspective distortion/misalignment" (POR, 61-62). That argument is inapposite because unlike Nepomniachtchi's post-capture image correction, which requires the creation of a new image before processing (POR, 46), Acharya recognizes data directly from the original captured check image on the mobile device. EX1003, 2:50-58; Petition, 27-28 (citing EX1002, ¶52). EX1036, ¶18.

Moreover, contrary to USAA's assertions, neither *Nepomniachtchi* nor *Acharya* expresses a preference between performing OCR on a bank server versus on a mobile device. *See* POR, 17, 46, 51-53, 59, 66, 67; EX2115, ¶33. Dr. Creusere

³ Tellingly, USAA does not argue that the prior art teaches away.

> IPR2021-01073 Petitioner Reply

admits that *Acharya* states OCR can be performed on its Remote Customer Terminal ("RCT")—*e.g.*, a mobile phone. EX1037, 112:12-113:17 (citing EX1003, 5:9-14). *See also* EX1002, ¶52 (citing EX1003, 2:45-67). And in *Nepomniachtchi*, like *Luo* and *Acharya*, "all data processing *might be performed at the mobile communication device*." EX1016, [0083]. *Also see* EX1004, 4 (performing OCR on mobile device). USAA also ignores that, like *Luo*, *Nepomniachtchi* specifically teaches pre-capture techniques for ensuring image quality. *Id.*, [0061] (discussing auto-focus and automatic flash features on a mobile device). EX1036, ¶¶19-21.

Further undermining USAA's argument, post-processing *cannot* correct all projective distortions, demonstrating that addressing such problems *before* capture would solve problems that post-processing cannot. *See, e.g.*, EX1043, 206 (Table 7 showing that an improved ("Ours") post-capture technique for correcting projective distortion had success rates of only "81.26%" and "83.96%" for specular and skewed images). Dr. Creusere admits that he did not consider the limitations of post-capture correction. EX1037, 89:13-21, 91:20-93:21 (expert did not review EX1043). Thus, a POSITA would have been motivated to implement techniques to correct projective distortion prior to image processing, as *Luo* teaches. EX1036, ¶22.

⁴ All emphasis and color annotations in this Reply are added unless otherwise noted.

> IPR2021-01073 Petitioner Reply

Second, USAA argues (without support from Dr. Creusere) that *Blackson* identifies drawbacks to *Luo*'s alignment guide technique. POR, 60-62. But *Blackson* describes **ATM** hardware (not mobile devices) having "special mechanisms to precisely position and align the instrument [e.g., check] with the reading devices" prone to becoming jammed. EX2108, 2:65-3:9. *Blackson* does not discuss any drawbacks relating to remote check deposit and in no way undermines the Petition's strong motivation to combine *Acharya* and *Luo*. EX1036, ¶23.

Third, USAA argues that the Petition fails to provide sufficient motivation to include autocapture in the Acharya/Luo combination. POR, 69-70. USAA assumes that, to combine Acharya and Luo, a POSITA would have needed to reject Luo's "primary embodiment," which USAA says is a manual capture embodiment. Id. USAA's assumption is baseless, as Luo makes clear that, once the mobile device determines that the monitoring criterion is satisfied, automatically capturing an image (instead of manually) is merely a choice between the two equally suitable techniques. EX1002, ¶75. Indeed, Dr. Creusere admits that, just like Luo, the '571 patent repeatedly describes "manual capture" and "auto capture" as two alternatives, without expressing a "preference for one" over the other. EX1037, 37:13-40:5. Thus, electing the autocapture option would have been obvious. See Allgenesis Biotherapeutics Inc. v. Cloudbreak Therapeutics, LLC, IPR2020-01438, Paper 29, 65-66 (P.T.A.B. Feb. 15, 2022). In addition, USAA's attempt to distinguish between

> IPR2021-01073 Petitioner Reply

manual capture and autocapture fails because autocapture is merely an obvious automation of manual capture. *Leapfrog Enters. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1160-61 (Fed. Cir. 2007) (automating features of prior art device using modern electronics does not require "particularized and specific motivations to combine"). Indeed, autocapture on mobile camera phones was already in commercial use. Petition, 14-15 ("Motorola GSM" camera phone that "automatically captures a business card image when the card is properly framed"). EX1036, ¶24.

Moreover, USAA is likewise wrong that *Acharya/Luo* requires a POSITA to "*replace* [*Acharya*'s] manual capture ... with [*Luo*'s] automatic capture." POR, 65-66. The Board has already found *Acharya* is agnostic on how the image is captured (Paper 20, 56). USAA cites only to *Acharya*'s statement that the "banking customer capture[s] the digital image of the financial instrument by the ... digital camera." POR, 52 (citing EX1003, 3:12-15).⁵ But Dr. Creusere concedes this sentence says nothing about *how* the banking customer captures the "digital image." EX1037,

⁵ USAA also mischaracterizes PNC's expert testimony: Dr. Mowry never mentioned a "manual capture implementation" in *Acharya* and thus could not have failed to "identify any problems ... in its existing manual capture implementation." POR, Footnote 11 (citing EX2116, 33:16-24).

> IPR2021-01073 Petitioner Reply

120:8-121:5. It certainly does not discuss manual capture, and autocapture was already known at the time of *Acharya*. *See, e.g.*, EX1004, 9.6 USAA also ignores *Acharya*'s direction to "prepare a digital image using ... a digital camera, *or any other method of preparing a digital image now known or later developed*." EX1003, 7:16-19.⁷ Thus, USAA's arguments fail to rebut the motivation to combine *Luo*'s autocapture with *Acharya*'s system. EX1036, ¶25-27.

Fourth, USAA argues that a POSITA would have been dissuaded from utilizing Luo's autocapture because an image would be captured even if lighting conditions were poor, the check was upside down, or other unsuitable conditions existed. POR, 50, 66-67. That argument is a red herring. As Dr. Creusere admits, a POSITA utilizing autocapture as in Luo would still apply judgment and knowledge in obtaining the check image. EX1037, 61:14-62:5, 67:3-21 (common sense that someone would want an image to be in focus). Acharya/Luo's autocapture leaves discretion for a user to adjust lighting, background, and other factors before aligning the check. USAA's own patents recognize that users are capable of accounting for other factors. See, e.g., EX1044, 8:10-21. Moreover, by 2008, camera phones,

⁶ Citations are to corrected EX1004. *See* Paper 20, Footnote 7.

⁷ USAA omitted the words "or any other method" when quoting this passage in the POR. *See* POR, 53 (citing EX1003, 7:14-19).

> IPR2021-01073 Petitioner Reply

including those employing the "Windows MobileTM" operating system disclosed in *Acharya* (see Petition, 51), included "autofocus" and "automatic exposure controls" that would not have interfered with *Luo*'s autocapture.⁸ *See* EX1053-EX1054. EX1037, 67:13-21, 68:1-6 (testifying that, by 2008, digital cameras included "autofocus" and "automatic exposure controls"). Thus, the notion that digital cameras would be used blindly except for an alignment guide—without the user discretion or existing automatic controls—is a fiction. Yet Dr. Creusere concedes that he did not account for whether a POSITA utilizing a digital camera with autocapture would have exercised such control. EX1037, 65:22-66:8. EX1036, ¶28-34.

For similar reasons, USAA is wrong that autocapture would have "increased errors" and "user dissatisfaction" compared to manual capture. POR, 70. The user would have pre-capture discretion and automatic techniques to improve image quality whether autocapture or manual capture was used. Additionally, Dr. Creusere concedes that the physical movement required to perform "*manual capture*" could

⁸ While Dr. Creusere testified in the district court proceeding (when opining that the '571 patent claims are enabled) that "digital cameras *all* had automatic exposure controls" and that a POSITA would not have been worried about lighting conditions, he refused to give that same testimony at his deposition in this proceeding. *Compare* EX1046, 152:2-20 [January 8, 2022 Creusere Deposition] *with* EX1037, 68:20-69:1.

> IPR2021-01073 Petitioner Reply

have the effect of *increasing errors* as compared to autocapture, because the user's action of "pressing a button" to "effect manual capture" can introduce what is known in the art as "motion blur." EX1037, 122:3-125:5. Indeed, USAA's expert at the district court trial regarding the '571 patent testified that "[t]he human eye really can't reliably assess how good an image is for check deposit," which further undermines USAA's argument that manual capture would produce fewer errors than autocapture. EX1041, 438:19-21. EX1036, ¶35.

Fifth, USAA argues that a POSITA would have been dissuaded from combining Luo's autocapture technique with Acharya's system because it would have (according to USAA) increased "computational burden" at the customer device. POR, 22-23, 69. But USAA's argument cannot be squared with the multitude of prior art references demonstrating that years before 2009, mobile devices already performed such processing. Petition, 13-15 ("LG VX9800" and "Motorola GSM" camera phones running business card monitoring, feedback, and capture software released in 2005 and 2006, respectively). Indeed, Nepomniachtchi demonstrates that the processing burden on the mobile device was *not* a significant concern to a POSITA at the time, because it envisions that "all data processing might be performed at the mobile ... device." EX1016, [0083]. The '571 patent concurs. EX1001, 12:33-35 ("[T]he present discussion is not limited in any way by discussion of where certain operations are described as operating."). In addition, USAA offers

> IPR2021-01073 Petitioner Reply

no further evidence that, once *Luo* determines alignment, effecting an autocapture would have been any more computationally intensive than a manual capture. Indeed, like *Luo*, the '571 patent itself does not mention processing burden in its discussion of manual capture and autocapture. EX1001, 4:27-34, 10:23-31; EX1037, 37:13-40:5. EX1036, ¶36-37.

Sixth, USAA asserts that precedent supports finding that there was insufficient motivation to combine Acharya and Luo because "disadvantages outweigh the uncertain benefits." POR, 69 (internal citations omitted). But all of the cases USAA cites concern circumstances in which, unlike here, there was tension between primary and secondary references vis-à-vis teaching competing technical solutions. For example, in *Henny Penny*, the primary reference's high temperature "analyzer" was replaced by a secondary reference's low temperature sensor, requiring "additional plumbing and complexity." Henny Penny Corp. v. Frymaster LLC, 938 F.3d 1324, 1328, 1332 (Fed. Cir. 2019). Arctic Cat Inc. v. Polaris Indus., 795 Fed. Appx. 827, 834 (Fed. Cir. 2019) (weighing "the putative benefits of the modifications ... against the drawbacks of the modification"). But there is no such tension between the teachings of Acharya and Luo. First, as explained earlier in this Section, both Acharya and Luo teach OCR on the customer's device—no modification required, and Acharya is agnostic regarding whether an image is captured automatically or manually, or whether pre- or post-capture processing is

Case: 23-2124 Document: 32-1 Page: 452 Filed: 03/11/2024

IPR2021-01073 Petitioner Reply

used. Thus, it is irrelevant whether "a [POSITA] would have believed that ... existing manual capture remote check deposit systems were effective and robust to alignment/perspective distortion issues in captured check images." POR, 69. USAA's argument ignores controlling precedent. *Pro-Mold and Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996) (motivation "may also come from the nature of a problem to be solved"). *Luo*'s express teaching that autocapture based on an alignment guide improves OCR was sufficient motivation to add that feature to *Acharya*. The Petition's combination is thus readily distinguishable from those in the cases USAA cites. EX1036, ¶38.

Moreover, USAA errs by attempting to recast the existence of mere design alternatives as negating clear motivation to combine. "[J]ust because better alternatives exist in the prior art does not mean that an inferior combination is inapt for obviousness purposes." *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012). "It's not necessary to show that a combination is 'the *best* option, only that it be a *suitable* option." *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 800 (Fed. Cir. 2021) (emphasis in original) (citations omitted). USAA does not argue that the prior art teaches away, nor could it. *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1382 (Fed. Cir. 2016) (a reference does not teach away from a combination that does not implicate the disadvantage identified in the reference). Absent a teaching away, the mere availability of alternatives is

> IPR2021-01073 Petitioner Reply

insufficient to defeat the Petition's strong motivation to combine *Acharya* and *Luo*. *Par Pharm., Inc. v. Twi Pharms., Inc.*, 773 F.3d 1186, 1197-98 (Fed. Cir. 2014) ("Our precedent ... does not require that the motivation be the best option, only that it be a suitable option from which the prior art did not teach away."). Dr. Creusere concedes that there is no evidence in this proceeding of teaching away. *See* EX1037, 105:1-107:8, 108:20-109:10. EX1036, ¶39.

Accordingly, Petitioner has shown ample evidence of motivation to combine *Acharya* and *Luo*, which USAA has not rebutted. EX1036, ¶40.

II. USAA'S ARGUMENTS THAT ACHARYA/LUO LACKS AN "IMAGE MONITORING AND CAPTURE MODULE" FAIL

Next, USAA argues that the Board should construe "image monitoring and capture module" as a means-plus-function limitation that requires "a digital camera, a mobile device operating system that can access live video frames from the camera via APIs and software that can monitor these frames," and then, on the basis of that claim construction, find that the Petition does not establish obviousness. POR, 30-31. Those arguments fail for at least three reasons. EX1036, ¶41.

A. <u>USAA Identifies No Reason for the Board to Change Its Prior</u> Claim Construction

At the time of institution, the Board was already aware of the district court's claim construction and of the parties' positions with respect to the term "image monitoring and capture module." Nonetheless, after according that construction the

> IPR2021-01073 Petitioner Reply

appropriate weight, 37 C.F.R. § 42.100(b), the Board construed the term according to USAA's proffered "plain meaning" construction, instead of the district court's means-plus-function construction. Paper 20, 13. EX1036, ¶42.

USAA identifies no reason why the Board should change that decision now. USAA drafted the challenged claims and has steadfastly maintained that "image monitoring and capture module" be construed according to its plain and ordinary meaning in *all prior proceedings*, including in *USAA v. Wells Fargo Bank*, *N.A.*, 2-18-cv-00245, (E.D. Tex.). Dkt. 100, 9, 10 (Jun. 13, 2019) (EX1052), *Wells Fargo Bank*, *N.A. v. USAA*, CBM2019-00004, Paper 7, 25-26 (P.T.A.B. Feb. 20, 2019), *Wells Fargo Bank*, *N.A. v. USAA*, IPR2019-01082, Paper 17, 24 (P.T.A.B Mar. 10, 2020), and *Mitek Systems., Inc. v. USAA*, IPR2020-00975, Paper 20, 30-32 (P.T.A.B Aug. 29, 2020). EX1036, ¶42.

B. The District Court's Actual Construction Does Not Change the Obviousness Analysis

In any event, the Petition demonstrates unpatentability even under the district court's construction, because there is no discernable difference between the district court's actual construction of "image monitoring and capture module" and that term's plain meaning as addressed in the Petition. The only structure the district court identified as corresponding to the claimed function of "image monitoring and capture" was "image monitoring and capture module 456 as set forth in the

> IPR2021-01073 Petitioner Reply

specification; and equivalents thereof." EX1034, 65 (internal citations omitted). This matches the intrinsic support USAA offered for its proffered "plain and ordinary meaning" construction. *Id.*, 64-65 (citing EX1001, 12:55-13:6, 13:34-38, 15:30-33). EX1036, ¶43.

Under the district court's construction, the corresponding structure requires nothing more than a **camera** (which may be positioned within a **mobile device** as in *Acharya/Luo*) and related **software**. POR, 64-65. To this end, the Petition (at 23, 51-52) cites every passage relied upon by the district court in its *Markman* ruling and expressly maps "image monitoring and capture module" to these features, thereby satisfying the district court's construction:

Feature	Disclosure cited in Petition (at 51)		
Camera	<u>EX1004, 6</u>		
	"a camera housing 105 incorporating an image sensor 115"		
Mobile device	<u>EX1004, 4</u>		
	"mobile phones, personal digital assistants (PDAs), and		
	laptops"		
Software	EX1004, 11		
	"uniquely stored program instructions that control the operation of one or more processors"		

> IPR2021-01073 Petitioner Reply

Thus, adopting the district court's construction of "image monitoring and capture module" would not change the outcome—the Petition already explains where that function and corresponding structure are found in the asserted prior art. EX1036, ¶44.9

C. <u>USAA's Attempts to Mischaracterize the District Court's</u> Construction Fail

Rather than apply the district court's actual construction, USAA seeks to add structural requirements that the district court never suggested, much less ordered.

The Board should reject USAA's attempts to inject additional structure into the

⁹ 37 C.F.R. § 42.104(b)(3) is satisfied by the Petition. *See, e.g., VTech Communications, Inc. v. Spherix Inc.*, IPR2014-01431, Paper 50, 18 (P.T.A.B. Feb. 3, 2016) (reasonable to treat "claim elements in dispute as non-means-plus-function limitations at the time of filing the Petition [while proffering a means-plus-function construction in district court] because ... patent owner and drafter of the claims, maintained that these claim elements are not means-plus-function limitations in the district court proceeding"); *id.*, 38-39 (petition adequate because "[a]lthough VTech did not identify specifically the corresponding structures in its Petition" ... "VTech explains how the [prior art] discloses every limitation of the claims, and points out the specific portions of [the prior art] and [expert's declaration] as support").

> IPR2021-01073 Petitioner Reply

"image monitoring and capture module" limitation that (a) is not in the district court's *Markman* ruling, (b) is not clearly linked to image monitoring and capture in the '571 patent, and (c) lacks expert support (Dr. Creusere offered no opinions on claim construction). Even if the Board were to add these limitations, however, the Petition still demonstrated the obviousness of the challenged claims. EX1036, ¶45.

First, USAA injects a requirement that the corresponding structure requires the use of "video frames." But the '571 patent expressly states that video frames are merely "an implementation" comprising "a video source" such as "video camera, a web camera, or a video-enabled phone." EX1001, 5:45-61. Embodiments of the image monitoring and capture module do not require production or monitoring of video frames at all. See, e.g., id., 13:7-10. Indeed, in contradiction to its new position here, in district court USAA argued that the patent "encompasses ... a single frame" and merely "may comprise a video source." EX1039, 37:18-23, 38:21-39:7. EX1036, ¶¶46-48.

In any event, if the Board determines that video frames are required, *Luo* discloses a video-capable device that would satisfy USAA's newly-proffered construction. EX1004, 6 ("video mode"). *See also* EX1037, 118:17-21, 122:5-18 (both "manual capture" and autocapture obtain image from "stream of images"). EX1036, ¶49.

> IPR2021-01073 Petitioner Reply

Second, USAA's assertion that the corresponding structure includes a "software abstraction layer" also fails. If it is related to the claimed function at all, a "software abstraction layer" is only required "[i]n an alternate example...." EX1001, 11:6-8. It is certainly not described as a requirement for all embodiments of the "image monitoring and capture module." The Board should reject USAA's attempt to insert this additional requirement into the claim. EX1036, ¶50.

If a software abstraction layer is required, however, such implementation would have been obvious because APIs were standard in 2008 for accessing phone cameras using the Windows Mobile system, as *Acharya* does. *See* Petition, 51; EX1045, 3 (discussing "DirectShow" API for accessing camera hardware), 9 (same for "Camera Capture API/SHCameraCapture" API). EX1036, ¶51.

> IPR2021-01073 Petitioner Reply

III. USAA'S ARGUMENTS THAT ACHARYA/LUO LACKS THE "DEPOSITING A CHECK" AND "PASSES THE MONITORING CRITERION" LIMITATIONS FAIL

USAA's final argument is that *Acharya/Luo* lacks the "depositing a check" and "passes the monitoring criterion" limitations because *Luo*'s alignment guide alone would not guarantee that a check image will be successfully deposited without error in every case. POR, 35-40 ("First, determining that edges of a check align substantially with reference lines is not the same as determining that check data can be electronically obtained from the image without error during electronic processing and clearing (which is what the claim construction requires).") Again, USAA's argument fails for multiple reasons. EX1036, ¶52.

¹⁰ USAA incorrectly represented that "[w]ith the exception of 'image monitoring and capture module," the district court has since adopted [USAA's or agreed to] constructions." POR, 27. The district court rejected USAA's argument that "passes the monitoring criterion" requires "determining that the quality of the monitored image feature is within acceptable threshold so that check data can be electronically obtained from the image without error during electronic processing and clearing." EX1034, 47-49. Instead, the court construed this term as "determining that a particular monitored criterion is within a predetermined range." *Id.*, 49. USAA has raised no arguments in the POR under the latter construction. EX1036, ¶72.

> IPR2021-01073 Petitioner Reply

First, the challenged claims are system claims, not method claims, which require "computer-readable instructions for depositing a check," where "depositing a check" means "providing a check to a depository in a form sufficient to allow money to be credited to an account." Petition, 22. USAA raises no serious argument that Acharya fails to disclose such computer readable instructions. Nor could it: Acharya expressly discloses "a system and method for initiating a deposit transaction ... e.g. a paper check" (EX1003, 1:17-22). Petition, 40-43. EX1036, \$\$ \$\$1.53-54.

Second, independent claims 1 and 9 expressly recite capture when the image of the check passes a **single** monitoring criterion; they do not require that passing that criterion guarantee a perfectly readable check image every time. ¹² See, e.g., EX1037 40:9-41:2; 52:22-53:10, 57:22-58:14. The Petition's *Acharya/Luo*

automatic image capture. See Section I.B.

¹¹ Contrary to USAA's assertion, *Acharya/Luo* does not modify *Acharya*'s teaching of "depositing a check" by "replac[ing] *Acharya*'s manual capture functionality with automatic capture." POR, 37. *Acharya* is agnostic regarding manual versus

¹² Dr. Creusere could not address whether a single monitoring criterion could ever guarantee that the image of a check "will be successfully deposited" without error in all situations. EX1037, 41:10-16, 58:16-59:1.

> IPR2021-01073 Petitioner Reply

combination implements the challenged claims in line with the '571 patent to increase the likelihood of "depositing a check" without errors when implemented in *Acharya*'s mobile phone. Petition, 33-39. *Acharya/Luo* renders the independent claims invalid by obtaining check data without error based on passing the alignment guide monitoring criteria under at least some conditions. *See, e.g., Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1002 (Fed. Cir. 2016) ("[C]ombinations of prior art that sometimes meet the claim elements are sufficient to show obviousness."). *See Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1326 (Fed. Cir. 2003). EX1036, ¶¶55-57.

USAA's assertions that the "depositing a check" and "passing the monitoring criterion" require the system to take "potential defects into consideration" such as "out-of-focus images," "unequal contrast or brightness," whether the document is "upside down," and "the location of a light source and light source distortions" (POR, 36 (internal citations omitted)) in effect require satisfying *multiple* criteria in a way that ignores the broad scope of the challenged claims.

13 See Warner-

¹³ The technical objective of the '571 patent is not to guarantee success under all circumstances, but "[t]o **increase the likelihood** of capturing a digital image of the check 108 that **may be** readable and processed such that the check 108 can be cleared" using "**one or more** monitoring criteria." EX1001, 3:54-58.

> IPR2021-01073 Petitioner Reply

Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 29 (1997); Bicon, Inc. v. Straumann Co., 441 F.3d 945, 950-52 (Fed. Cir. 2006); Texas Instruments Inc. v. U.S. Int'l Trade Comm'n, 988 F.2d 1165, 1171 (Fed. Cir. 1993) (interpreting claims to "read an express limitation out of the claims" improper because "[c]ourts can neither broaden nor narrow claims to give the patentee something different than what he has set forth") (internal citations omitted). EX1036, ¶57.

Indeed, USAA's newfound argument that the challenged claims implicitly require satisfying multiple monitoring criteria to guarantee deposit is particularly improper because USAA affirmatively *broadened* the claims during prosecution from requiring a "*plurality of* monitoring criteria" to encompass capture based on monitoring a single criterion. EX1007, 93. Now, faced with prior art not before the Examiner, USAA should not be allowed to assert that the claims actually require passage of multiple monitoring criteria. EX1036, ¶58.

The intrinsic record alone therefore refutes USAA's assertion that the claims require that the check image will be successfully deposited every time the monitoring criterion is satisfied. The extrinsic evidence does likewise. For example, in USAA's litigation against PNC, Dr. Creusere testified: "It does not have to be perfect every time. It just ... has to be demonstrated to work." EX1046, 157:6-12. See id., 158:18-159:8 ("I might well deem [a 10% success rate] to be a complete

> IPR2021-01073 Petitioner Reply

success"), 269:9-13.¹⁴ And at the trial, USAA asserted that PNC's mobile application infringes challenged claims despite its non-zero error rate. *See, e.g.*, EX1038, 688:17-689:7. EX1036, ¶¶59-60.

Third, capturing the check image upon alignment with an alignment guide, which is what *Luo* teaches, is an expressly disclosed embodiment of the '571 patent's claimed invention.

"[i]n an implementation, ... an alignment guide ... determine[s] whether the check's positioning ... is proper or sufficient for further processing of the image" using "[a]ny known technique(s) for edge detection and/or corner detection ... such that if corner detection of the check 108 in the image 230 is achieved, then it may be concluded that the image 230 may be properly processed and cleared by a depository (i.e., the image 230 passes the monitoring criteria)."

¹⁴ Dr. Creusere confirmed that he stood by his prior opinions. EX1037, 47:10-49:8, 58:16-59:7.

> IPR2021-01073 Petitioner Reply

EX1001, 7:38-57.¹⁵ Given that the '571 patent expressly discloses an embodiment in which image capture occurs solely upon passing an alignment guide monitoring criterion, USAA's assertions that the claims exclude capture based on alignment with a guide alone falls flat. EX1036, ¶¶61-62.

Fourth, USAA argues that the Acharya/Luo combination does not teach these limitations because OCR'ing a check is unlike OCR'ing a business card. POR, 40-44. Even if that statement were true (which it is not, as discussed below), it would be of no moment because the prior art would still teach each of the "passes the monitoring criteria" and "depositing a check" limitations. EX1036, ¶63.

Moreover, on examination, each of USAA's arguments in support of this position is without merit. USAA begins from the false premise that all checks are handwritten. POR, 42 ("[E]ach of the fields read by *Acharya* is either handwritten or MICR printed."). That is incorrect. *Acharya* does not say that checks must include handwritten text. *See, e.g.*, EX1003, 4:66-5:2. And Dr. Creusere admits "some checks are entirely computer printed." EX1037, 131:1-4.

¹⁵ Dr. Creusere likewise acknowledges that an alignment guide is a monitoring criterion disclosed by *Luo*. EX1037, 43:16-44:14, 54:6-55:12.

> IPR2021-01073 Petitioner Reply

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EX1048, FIG. 8. *See also* EX1049, FIG. 1, 4:42,49-50. Besides, even if OCR of handwriting were harder, Dr. Creusere testified only that it was "a little more difficult" than printed text. EX1037, 133:10-13. And prior art cited by the '571 patent (which Dr. Creusere never read) shows that techniques for OCR'ing handwritten text from check images were known for over 10 years before the purported invention. EX1051, 770 (discussing "accuracy of about 94.2%"); EX1037, 126:8-19, 131:17-136:16; *see also* EX2105, 2 (describing improved methods for reading handwriting on checks). EX1036, ¶64-67.

The POR next postulates (without citation) that OCR of MICR font is especially difficult. POR, 43 (citing EX2215, ¶29 (POSITA would have expected

> IPR2021-01073 Petitioner Reply

"MICR characters" "to be more challenging to read through [OCR]")). That too is wrong. The '571 patent on its face lists U.S. Patent No. 7,590,275, which states that MICR characters are "often printed according to the 'E13B' font specification developed by the American Bankers Association", "designed to be easily recognized by ... optical character recognition systems" EX1050, 1:22-32, 5:61-64. Dr. Creusere did not consider EX1050 and was not familiar with E13B. EX1037, 139:14-140:9. EX1036, ¶68.

Furthermore, USAA's arguments that implementing the claims requires monitoring other aspects of image capture ignores that users or mobile devices in 2008 would already correct for such concerns. Section I.B. In short, there was nothing inherently more difficult about reading a check than reading a business card in 2008. EX1036, ¶69.

Finally, USAA's assertions that there is some meaningful inconsistency between the testimony of PNC's expert witness in the district court trial and PNC's positions in the Petition (POR, 38-40) are without substance. As the Board is well aware, a claim may be both obvious and not enabled. See, e.g., Par Pharm., Inc. v. TWi Pharms., Inc., 120 F. Supp. 3d 468, 479 (D. Md. July 28, 2015) (determining, on remand from Federal Circuit, that claims are obvious and not enabled). Notably, USAA does not challenge the presumption that Acharya and Luo are enabled for what they teach. See In re Antor Media Corp., 689 F.3d 1282, 1287-1288 (Fed. Cir.

> IPR2021-01073 Petitioner Reply

2012); Apple Inc. v. Corephotonics, Ltd., 861 Fed. Appx. 443, 450 (Fed. Cir. 2021) (nonprecedential) ("regardless of the forum, prior art patents and publications enjoy a presumption of enablement, and the patentee/applicant has the burden to prove non-enablement for such prior art"). To the contrary, Dr. Creusere refused to state that Acharya/Luo would not work. EX1037, 49:16-50:10 ("[Y]ou don't offer any opinion that Acharya and Luo would not work to deposit a check successfully in some instances. Correct? A. ... I do not offer that opinion."). EX1036, ¶70.

Moreover, in the district court, PNC asserted that the '571 patent specification did not enable the full scope of the asserted claims, which do not limit the environment in which the check image is captured. See EX1047, ¶173 (referring to ¶143 (the claims "should be enabled for any background"); ¶147 (the claims cover "an alignment guide in any environment, including environments that would make such a determination very difficult.")); EX2120, ¶147 (same paragraph as ¶147 of EX1047 stating that "the claims place no constraints on the background, lighting, angle of the camera, and so forth. Designing software" and "ensuring that [an image] is of sufficiently high quality to be depositable ... is an extremely difficult task" in such an environment). EX2111, 9. That is a wholly separate issue from whether a single implementation (i.e., alignment guide and autocapture taught by Acharya/Luo) is obvious in some environments, which is all that is required for demonstrating obviousness. Allergan, Inc. v. Apotex Inc., 754 F.3d 952, 963 (Fed.

> IPR2021-01073 Petitioner Reply

Cir. 2014) (Patent challenger need only "show[] that *any* compounds within the *broad genus claimed* ... were obvious at the time of the invention."). There is no inconsistency between PNC's district court arguments that the claims are not enabled and the Petition's clear demonstration that the claims are rendered obvious

by prior art that was never presented to the Examiner. EX1036, ¶71.

CONCLUSION

The challenged claims should be found unpatentable.

Respectfully Submitted,

Dated: August 8, 2022 /Monica Grewal/

Monica Grewal Reg. No. 40,056

> IPR2021-01073 Petitioner Reply

Petitioner's Appendix of Exhibits

Exhibit Number	Description
1001	U.S. Patent 8,977,571
1002	Declaration of Todd Mowry
1003	U.S. Patent No. 8,768,836
1004	Chinese Patent Application Publication No. CN 1897644A (certified translation attached "A method and system for capturing images")
1005	U.S. Patent Application Publication No. 2007/0262148
1006	RESERVED
1007	File History of U.S. Patent No. 8,977,571
1008	Bruno-Britz, Maria, "Mitek Launches Mobile Phone Check Capture Solution," Bank Systems and Technologies InformationWeek (Jan. 24, 2008).
1009	U.S. Patent No. 7,950,698
1010	U.S. Patent No. 8,290,237
1011-1013	RESERVED
1014	Mitek Systems, "ImageNet Mobile Deposit," presented at "FSTC's 2008 Annual Conference (June 2008)
1015	U.S. Patent Application Publication No. 2006/0164682
1016	U.S. Patent Application Publication No. 2009/0185241
1017-1018	RESERVED
1019	V User Guide, https://www.lg.com/us/support/manualsdocuments? customerModelCode=%20LGVX9800&csSalesCode=LGVX9800,

IPR2021-01073 Petitioner Reply

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1020	MING Phone User Manual, 2006
1021	U.S. Patent Application Publication No. 2005/0267843
1022	U.S. Patent Application Publication No. 2004/0236647
1023	USAA v. PNC Bank N.A., No. 2:20-cv-319 (E.D. Tex.), Dkt. 112 (June 1, 2021) (P.R. 4-3 Joint Claim Construction and Prehearing Statement)
1024	USAA v. Wells Fargo Bank, N.A., No. 2:18-cv-245 (E.D. Tex.), Dkt. 100 (June 13, 2019) (Claim Construction Memorandum Opinion and Order)
1025	Japanese Patent Application Publication No. 2014-23158 (certified translation attached "Imaging Device")
1026	USAA v. PNC Bank N.A., No. 2:20-cv-319 (E.D. Tex.), Dkt. 48 (Feb. 8, 2021) ("Docket Control Order")
1027-1028	RESERVED
1029	Doermann, D. et al., "Progress in Camera-Based Document Image Analysis," Proceedings of the Seventh International Conference on Document Analysis and Recognition (ICDAR'03), IEEE
1030	Judge Gilstrap March 7, 2022 Trial List ("Judge Gilstrap Trial List")
1031	<i>USAA v. PNC Bank N.A.</i> , No. 2:20-cv-00319 (E.D. Tex.), Dkt. 94 (Apr. 19, 2021) ("Motion to Consolidate")
1032	RESERVED
1033	U.S. Provisional Patent Application No. 61/022,279
1034	USAA v. PNC Bank N.A., No. 2:20-cv-00319 (E.D. Tex.), Dkt. 265 (Nov. 22, 2021) ("Claim Construction Memorandum Opinion and Order")

IPR2021-01073 Petitioner Reply

1035	Declaration of Gregory H. Lantier
1036	Supplemental Declaration of Todd Mowry
1037	Transcript of Deposition of Dr. Charles Creusere, IPR2021-01073 and IPR2021-01070 (July 25, 2022) ¹⁶
1038	Excerpts from Trial Transcript Vol. 2 (May 11, 2022), USAA v. PNC Bank N.A., No. 2:20-cv-00319 (E.D. Tex.)
1039	Excerpts from Markman Hearing Transcript, <i>USAA v. PNC Bank N.A.</i> , No. 2:20-cv-00319 (E.D. Tex.) (November 10, 2021)
1040	RESERVED
1041	Excerpts from Trial Transcript Vol. 2 (May 10, 2022), USAA v. PNC Bank N.A., No. 2:20-cv-00319 (E.D. Tex.)
1042	U.S. Patent No. 9,569,756
1043	July 25, 2022 Creusere Deposition Exhibit 7 (Tan et al., Restoring Warped Document Images through 3D Shape Modeling, 28 IEEE Transactions on Pattern Analysis and Machine Intelligence 2 (February 2006))
1044	U.S. Patent No. 10,482,432
1045	Jim Wilson, <i>What's New for Developers in Windows Mobile 5.0</i> (May 20, 2005) (Archived April 20, 2006 at: https://web.archive.org/web/20060420065517/http:/msdn.microsoft.com/mobility/default.aspx?pull=/library/enus/dnppcgen/html/whatsnew_wm5.asp#whatsnew_wm5_topic2)

¹⁶ Dr. Creusere submitted declarations in support of both IPR2021-01070 and IPR2021-01073 and the parties agreed to conduct a single day combined deposition for both proceedings.

IPR2021-01073 Petitioner Reply

1046	Excerpts from Transcript of Deposition of Dr. Charles Creusere, <i>USAA v. PNC Bank N.A.</i> , No. 2:20-cv-00319 (E.D. Tex.) (January 8, 2022)
1047	Excerpts from Expert Report of Dr. Omid Kia, <i>USAA v. PNC Bank</i> , <i>N.A.</i> , 2:20-cv-319-JRG (Nov. 24, 2021)
1048	U.S. Patent Application Pub. No. 2004/0247168
1049	U.S. Patent No. 5,359,667
1050	July 25, 2022 Creusere Deposition Exhibit 11 (U.S. Patent No. 7,590,275)
1051	July 25, 2022 Creusere Deposition Exhibit 10 (Gupta et al., An Integrated Architecture for Recognition of Totally Unconstrained Handwritten Numerals, 7 International Journal of Pattern Recognition and Artificial Intelligence 4 (1993))
1052	USAA v. Wells Fargo Bank, N.A., 2-18-cv-00245, (E.D. Tex.). Dkt. 100 (Jun. 13, 2019)
1053	Toshiba Portégé G910 / G920, Mobile Gazette (Feb. 13, 2008) (Archived February 17, 2008 at https://web.archive.org/web/20080217143930/http://www.mobilegazette.com:80/toshiba-portege-g910-08x02x13.htm)
1054	<i>i-Mate Ultimate 9502</i> , Mobile Gazette (Oct. 26, 2007) (Archived October 26, 2007 at: https://web.archive.org/web/20071026114130/http://www.mobilegazette.com/imate-ultimate-9502-07x10x26.htm)
1055	Sony Ericsson XPERIA X1, Mobile Gazette (Feb. 10, 2008) (Archived February 12, 2008 at: https://web.archive.org/web/20080212123731/http://www.mobilegazette.com/sony-ericsson-xperia-x1-08x02x10.htm)

> IPR2021-01073 Petitioner Reply

CERTIFICATE OF COMPLIANCE

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petitioner Reply totals 5,581 words, which is less than the 5,600 words allowed under 37 CFR § 42.24(c)(1).

Respectfully submitted,

Dated: August 8, 2022 /Jonathan P Knight/

Jonathan P. Knight Reg. No. 69,866

v

IPR2021-01073 Petitioner Reply

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), I hereby certify that on August 8, 2022, I caused a true and correct copy of the foregoing materials:

- Petitioner Reply
- Exhibits 1036-1039, 1041-1055
- Certificate of Compliance
- Updated Table of Exhibits

to be served by electronic mail, as agreed to by the parties, upon the following:

USAA-IPRs@irell.com

/Jonathan P Knight/ Jonathan P. Knight Reg. No. 69,866

IPR2021-01073 Patent No. 8,977,571

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION ("USAA"), Patent Owner.

Case No. IPR2021-01073 Patent No. 8,977,571

PATENT OWNER'S OBJECTIONS TO EVIDENCE PURSUANT TO 37 C.F.R. § 42.64(b)

IPR2021-01073 Patent No. 8,977,571

Pursuant to 37 C.F.R. § 42.64(b)(1), Patent Owner United Services

Automobile Association ("USAA"), submits the following objections to evidence accompanying Petitioner's Reply to Patent Owner's Response. These objections are timely under 37 C.F.R. § 42.64(b)(1) because they are being filed within five

(5) business days of service of Petitioner's reply evidence.

USAA objects to Exhibits 1038, 1039, 1041, 1046, 1047 as incomplete under Federal Rule of Evidence (FRE) 106.

USAA objects to Exhibit 1036 under FRE 702 as including conclusory statements and/or mischaracterizations of the patent and/or cited art, which are not based on sufficient facts or data, are irrelevant, are not based on a reliable foundation, and/or constitute conclusory opinion without sufficient support. *See also Daubert v. Merrell Dow Pharms, Inc.*, 509 U.S. 579 (1993).

USAA objects to Exhibits 1043, 1045, 1051, and 1053-1055 as hearsay, irrelevant, and lacking foundation. USAA objects to Exhibits 1043, 1045, 1051, and 1053-1055 as hearsay under FRE 801 to the extent that Petitioner is attempting to use Exhibits 1043, 1045, 1051, and 1053-1055 as evidence to prove the truth of the matters asserted therein. USAA further objects to Exhibits 1043, 1045, 1051, and 1053-1055 because Petitioner has not established the relevance of these exhibits under FRE 401 to any material issues in this proceeding and any probative

IPR2021-01073

Patent No. 8,977,571

value would be substantially outweighed by the danger of unfair prejudice, confusing the issues, undue delay, and wasting time. USAA further objects to Exhibits 1043, 1045, 1051, and 1053-1055 because they do not fall within the categories of documents considered self-authenticating under FRE 902 and Petitioner has not produced evidence sufficient to support a finding that Exhibits 1043, 1045, 1051, and 1053-1055 are what Petitioner says they are.

USAA further objects to the Petitioner's Reply under 37 C.F.R. § 42.23(b) as containing new, non-responsive arguments, and to Exhibit 1036 to the extent it contains supporting opinions thereof.

USAA reserves the right to present further objections to these or additional exhibits submitted by Petitioner, as allowed by the applicable rules or other authority, including without limitation upon conclusion of any depositions taken of Petitioner's witnesses.

Dated: August 15, 2022 Respectfully submitted,

/Anthony Rowles/

Anthony Rowles (Reg. No. 68,673) Michael R. Fleming (Reg. No. 67,933) Jason Sheasby (*pro hac vice*) Irell & Manella LLP 1800 Avenue of the Stars, Suite 900 Los Angeles, CA 90067

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IPR2021-01073 Patent No. 8,977,571

CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. section 42.6, that on August 15, 2022, a complete copy of the foregoing document **PATENT OWNER'S**

OBJECTIONS TO EVIDENCE PURSUANT TO 37 C.F.R. § 42.64(b) was

served upon the following, by ELECTRONIC MAIL:

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> /Susan M. Langworthy/ Susan M. Langworthy

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION ("USAA"), Patent Owner.

Case No. IPR2021-01073 Patent No. 8,977,571

UNITED SERVICES AUTOMOBILE ASSOCIATION ("USAA")'S PATENT OWNER SUR-REPLY

Mail Stop "PATENT BOARD"

Patent Trial and Appeal Board U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450

Case IPR2021-01073 Patent No. 8,977,571

this as a problem. Indeed, Petitioner itself asserts that camera phones in 2008 had "autofocus" features that would resolve this button-press "motion blur" issue, if it existed. *See* Reply, 8-9. Nepomniachtchi presents an algorithm for addressing blur from a lack of focus—[0073]—that Petitioner's expert ignored. And Petitioner's expert admits that shaking can occur from the user hovering over the image during auto-capture. EX2125, 16:2-10.

D. Petitioner's Asserted Benefits of the Combination are Unpredictable and Outweighed by Drawbacks

There is substantial evidence in the trial record that the alleged benefits of incorporating Luo's auto-capture technique, as compared to the manual check image capture approaches known to a POSA, would be unpredictable and have significant downsides, motivating a POSA against the asserted combination. The evidence of record on these points is essentially undisputed. For example, Petitioner does not dispute:

- None of the asserted prior art check deposit references (e.g., Nepomniachtchi, Acharya, ImageNet, or any others) teach the use of automatic capture of check images. EX2115, ¶35.
- The only basis for Luo's purported teaching that projective distortion is an issue when capturing images of documents is the hypothetical situation where a user "holds the business card in front of the camera lens with one

Case: 23-2124 Document: 32-1 Page: 481 Filed: 03/11/2024

Case IPR2021-01073 Patent No. 8,977,571

hand, while holding the camera with the other hand when taking pictures." EX1004, 1. Even assuming that this situation is common when photographing business cards (and thus justifying Luo's approach in that field), there is no evidence that this is an issue for a check deposit system like Acharya's. *See* EX2116, 17:9-18:5 (Petitioner's expert unable to identify any such evidence). To the contrary, the evidence of record regarding mobile check deposit implementations in the art consistently shows the check lying flat on a table. *See, e.g.*, EX1014, 38-39.

- The prior art (i.e., Nepomniachtchi) "already taught...suitable techniques for addressing projective distortion" (Reply, 2) and a POSA would have considered that prior art together with Acharya/Luo and would have recognized that "Acharya/Luo would have readily been combined with Nepomniachtchi." (Pet., 73-74; EX2116, 35:1-9, 124:12-23).
- A POSA could have achieved the same or virtually the same benefits by adding Luo's alignment guide while retaining the user's choice to manually capture the image when the check is indicated to be correctly aligned. *See* EX1004, 6-7; Pet., 54 ("alignment with the reference lines reduces projective distortion and reduces blur").

With that backdrop, the motivation to combine theory asserted in the Petition is already seriously undermined even without further evidence of critical

Case IPR2021-01073 Patent No. 8,977,571

disadvantages resulting from the combination. Nevertheless, USAA has identified various disadvantages that a POSA would perceive with the proposed combination.

First, there is no dispute that the automatic capture technique taught by Luo triggers capture of an image based solely on whether the edges of the document line up with the reference lines displayed on the screen. See EX2115, ¶27. As Dr. Creusere explains, a POSA would have been discouraged from using this technique for check image capture because there are a multitude of factors that impact whether a captured check image can be successfully processed for deposit, many of which have nothing to do with alignment or "projective distortion" that Luo purportedly corrects. EX2115, ¶28, 36.

Petitioner argues that this is a "red herring" because the user would "still apply judgment and knowledge in obtaining a check image," e.g., by "adjust[ing] lighting, background, and other factors *before* aligning the check." Reply, 8. This is an improper new argument in reply. Moreover, Petitioner cites no evidence for this assertion that users would understand that they need to adjust the image so that all of the various other image quality factors are adequate before they place the check in the frame of the displayed alignment guide. *See id.* To the contrary, the alignment monitoring mechanism in Luo is automated. There is no evidence in the record that a user would have time to adjust for other factors before the automatic checking of alignment occurs. And the reference does not teach that the alignment mechanism

> Case IPR2021-01073 Patent No. 8,977,571

should wait for user judgement. Petitioner's expert admitted that the time to perform auto-capture is "extremely small". EX2125, 14:19-15:2. Moreover, a POSA would be significantly deterred from accepting the risk that a customer would not understand or have the time to employ its own judgment. Moreover, Petitioner's expert admits that his combination of Luo and Archaya has no tools to deal with a rejected image. EX2125, 49:13-21, 55:19-56:1. As a result, a POSA would want to do everything to ensure that the initial capture was successful, which would lead them to universally adopted manual capture technique, which ensures user judgment can be applied.

Petitioner points to another USAA patent that it contends "recognize[s] that users are capable of accounting for other factors" (citing EX1044, 8:10-21) but the cited passage actually supports USAA's theory. EX1044, 8:10-18. This passage indicates that a user can account for these factors <u>if specifically instructed</u> how to do so, and that the graphical illustration on the screen will direct the user's behavior.

Second, Petitioner argues that automatic capture cannot increase the "computational burden" on the mobile device because certain commercial devices "already performed such processing." Reply, 10. Petitioner's argument misses the point; the issue is not whether it is theoretically feasible for a mobile device at the time to perform the processing required to implement automatic capture, but whether a POSA would have found it desirable (on balance) to **add** the additional complexity

Case IPR2021-01073 Patent No. 8,977,571

and processing required to continually monitor an image in view and determine the appropriate time to capture the image, as opposed to simply waiting for a manual button input from the user. *See* EX2115, ¶35 (explaining the complex processing required to "obtain and analyze a series of images in real-time to determine when to activate the automatic capture function"). Petitioner's expert cannot support the reply argument either because he admitted he did not do the analysis. EX2116, 24:11-25:16 (no data on "what the CPU burden would be on the type of mobile phones that were used in 2008 by implementing an auto-capture functionality" and "did not perform that type of analysis" to assess relative burden compared to Nepomniachtchi approach).

Petitioner then argues that "once Luo determines alignment, effecting an autocapture would [not] have been any more computationally intensive than a manual capture." Reply, 11. But the question facing a POSA is whether to incorporate the image monitoring necessary to determine alignment of an image in view in the first place, as this is a prerequisite to auto-capture as recited in the claims. *E.g.*, EX1001, cl. 1 ("capture the image of the check with the camera *when the image of the check passes the monitoring criterion*"). Certainly, a POSA could have simply displayed a static alignment guide on the screen to aid the user in manually aligning the check (which, as discussed above, would have provided all of Luo's asserted benefits) and incur no additional computational cost, but that is just a further

Case IPR2021-01073 Patent No. 8,977,571

reason why a POSA would not have been motivated to implement the more intensive image analysis contemplated by the combination. Petitioner's expert ignored the question of whether an alignment guide with feedback would provide any benefit over a static guide. EX2125, 32:4-15.

Third, Petitioner's arguments rest on an incorrect assumption that a POSA would view automatic capture based on alignment with a guide as a "mere design alterative" to the prevailing manual capture approach, such that Luo's statement that "autocapture based on an alignment guide improves OCR was sufficient motivation to add that feature to Acharya." Reply, 12-13. The factual record shows that at the time of the invention, autocapture based on alignment with a guide (as in Luo) was not a suitable replacement for manual capture in images. For example, Petitioner contends the "LG VX9800" camera phone released in 2006 was an example of "running business card monitoring, feedback, and capture software" in the prior art. Reply, 10. But when Petitioner's own consultant attempted to demonstrate this functionality using that same device, the system was unable to correctly OCR something as simple as a person's name printed on a standard business card. See EX2121, 28:8-19, 29:16-33:8, 37:9-22 ("It is shown, it's their contact form there that they used on this phone, so there's a little spot for a picture. Probably I could shoot a picture of you and add that to this record. There is your name misspelled Case: 23-2124 Document: 32-1 Page: 486 Filed: 03/11/2024

Case IPR2021-01073 Patent No. 8,977,571

because its recognition wasn't superb in the day..."). Petitioner offers no response to this testimony—elicited by Petitioner from its own consultant—in its Reply.

Petitioner's district court expert Dr. Kia opined unequivocally that "ensuring alignment with an alignment guide *does not suffice* to render the check image usable for deposit" due to the "[n]umerous other criteria besides alignment [that] must be met before a check image would be depositable." EX2120, ¶140. He further opined that "edge detection techniques existing in 2009...could not be used to locate the image of the check in general" and there were no "techniques available for ensuring that a check image that was determined to align with an alignment guide would be of sufficient quality to be depositable." *Id.*, ¶147. Dr. Kia stood by those opinions when he testified before a jury in district court. EX2124, 957:25-958:7; 979:16-980:1. He based this on his analysis of the prior art and conclusion that essential teachings were missing from the prior art, including "algorithms to extract the check image from the background," the "combination of monitoring criteria to obtain depositable check image," and "[r]anges to apply to obtain depositable check image." EX2124, 19. This testimony is directly relevant to the obviousness analysis because it evidences the extreme unpredictability associated with capturing sufficient check images using auto-capture.

Case IPR2021-01073 Patent No. 8,977,571

Dated: September 30, 2022 Respectfully submitted,

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Paper 69 Entered: November 28, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK, N.A, Petitioner,

V.

UNITED STATES AUTOMOBILE ASSOCIATION Patent Owner.

IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1)

Record of Oral Hearing Held Virtually: Tuesday, October 25, 2022

Before MICHAEL R. ZECHER, DAVID C. McKONE, SCOTT B. HOWARD, and JULIET MITCHELL DIRBA, *Administrative Patent Judges*.

IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1)

APPEARANCES

ON BEHALF OF THE PETITIONER:

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ON BEHALF OF THE PATENT OWNER:

JASON SHEASBY, ESQ. ANTHONY Q. ROWLES IRELL & MANELLA LLP 1800 Avenue of the Stars Suite 900 Los Angeles, CA 90067 310-277-1010

The above-entitled matter came on for hearing on Tuesday, October 25, 2022, commencing at 10:00 a.m. EST, by video/by telephone.

- 1 sufficient for deposit that will meet the criteria for
- 2 deposit.
- There is very little dispute about this. If you go
- 4 to slide 42 --
- 5 JUDGE HOWARD: So if I am -- this is Judge Howard --
- 6 so if I understand your construction of the claim, the claim
- 7 requires that the -- or for the system to always process a
- 8 check -- always get a check that can be deposited. If there's
- 9 any error, then that's something that's not covered by the
- 10 claim?
- MR. SHEASBY: So, Your Honor, the way it played out
- in the District Court is failures are not covered by the
- claims, successes are covered by the claims. So the system doesn't
- need to be 100 percent successful. The system needs to be
- able to achieve it. And it -- we will show is the record does
- 16 not establish that using the check image itself, that the
- 17 Acharya-Luo combination has ever achieved the captured image
- 18 of a check sufficient for deposit.
- 19 So it doesn't have to be 100 percent successful.
- 20 But it has to be able to achieve it. And the --
- JUDGE MCKONE: So you're -- you're saying that the
- 22 Acharya-Luo combination could never achieve a depositable
- check.
- MR. SHEASBY: I'm saying there's no evidence that
- 25 it is ever achieved a depositable check, Your Honor.
- JUDGE MCKONE: Well is it your argument that it

- 1 could never? Or that they're -- that they just haven't shown
- 2 a working system out there that has combined those two
- 3 references to -- to have a system that deposits a check?
- 4 MR. SHEASBY: Yeah. I'm definitely not saying that.
- 5 I'm saying that based on the record of evidence, it could
- 6 never do so, Your Honor.
- 7 JUDGE MCKONE: Okay. Thank you.
- 8 MR. SHEASBY: In other words, have I actually
- 9 experimented with the combination of Acharya and Luo? I have
- 10 not. But what I have done is I've collected the evidence
- 11 that's in the record before Your Honors. And that evidence
- makes clear that it would not be successful.
- To be clear, if you go to slide 42, petitioner was
- 14 absolutely definitive about this in its briefing in front of
- 15 the Board. And in specific what it said is that meeting the
- 16 deposit requirement of the claims thus would have required
- 17 identifying additional monitoring criteria to ensure that the
- 18 check image is in a form suitable for deposit. So this is as
- 19 to the '779 patent [inaudible]
- JUDGE HOWARD: But this was -- this is at the
- 21 District Court when they were arguing enablement; is that
- 22 correct?
- MR. SHEASBY: This is in a motion for summary
- judgment when they were speaking about I think enablement in
- 25 section 112, paragraph -- written description as well, Your
- 26 Honor. And --

- 1 JUDGE HOWARD: And you would -- you agree with me
- 2 that there's a difference between what's necessary for the
- 3 scope of enablement and what might be necessary to show that
- 4 a claim is obvious.
- 5 MR. SHEASBY: Yes and no. So there are --
- 6 JUDGE HOWARD: Well, I mean for example, if I have
- 7 something which literally teaches all the elements of
- 8 something would be anticipated and therefore obvious, but it
- 9 also might just be that the specification doesn't disclose --
- doesn't teach someone how to make and use the entire scope of
- 11 the claim, and therefore it would be indefinite.
- MR. SHEASBY: So I agree with that. The response I
- would give is if you look at *KSR*, there are subsidiary
- elements of enablement and subsidiary elements of obvious
- 15 that overlap. And so one of the obv- -- one of the elements
- of enablement is of course the knowledge and skill in the art
- 17 that is also one of the requirements for obviousness under
- 18 KSR.
- 19 Another element of enablement is predictability.
- 20 And that is also an overlap with KSR. And so that's also an
- 21 overlap with enablement. So --
- JUDGE HOWARD: But again there's a difference between
- 23 predictability for the entire scope of a claim and ability --
- or predictability for a specific combination. Those aren't
- 25 the two same questions.
- MR. SHEASBY: Well there's a -- the que- -- it --

- 1 that is correct, Your Honor. And so let me give you an
- 2 example of that. If we go to slide 43, the patent offers --
- 3 patent owner's experts have repeatedly conceded that in a
- 4 form sufficient to allow deposit of a check requires that it
- 5 be able to be machine readed and machine extracted.
- 6 And if you go to slides 44 and 45, petitioner's
- 7 expert in the District Court didn't say there was a note -- a
- 8 scope problem, didn't say that there was some embodiments
- 9 that were enabled, and some embodiments that were not
- 10 enabled. He repeatedly said that a POSA would not believe
- that an alignment guide was sufficient to capture an image of
- 12 a check for the purposes of deposit.
- He said it repeatedly on slide 45. You see that as
- well. And in addition, the previous Patent Trial and Appeal
- Board who affirmed the validity of this patent made the same
- observation, that a person of ordinary skill in the art would
- 17 not believe that an alignment guide was sufficient for the
- 18 purposes of depositing a check.
- 19 So the answer is --
- 20 JUDGE MCKONE: Can I -- can I ask a
- 21 question here? In the -- in the District Court, so we'll just
- 22 focus on the district court and the -- the summary judgment
- 23 for enablement and written description. Did patent owner
- 24 oppose that motion?
- MR. SHEASBY: Not on the -- we did, but we did not
- oppose it on the basis of what the claim required. In other

Case: 23-2124 Page: 494 Document: 32-1 Filed: 03/11/2024 IPR2021-01070 (Patent 8,699,779 B1) IPR2021-01073 (Patent 8,977,571 B1) 1 words, we conceded the claim required that the image be 2 sufficient for the purposes of deposit. JUDGE MCKONE: Okay. But do you oppose the 3 4 arguments that that wouldn't have been enabled or described in 5 the '571 patent or the '779 patent patent? 6 MR. SHEASBY: We con- -- we -- we believe -- we 7 argued that the '571 patent was enabled. And if you go to 8 slide 41, I can -- I can talk you through that, Your Honor. JUDGE HOWARD: And -- and also just to be clear, the 9 10 -- the District Court rejected this. And it went to trial, 11 the jury also rejected petitioner's argument; right? MR. SHEASBY: So the -- the '779 never went 12 13 to trial, Your Honor. The reason being is that we're not 14 aware of any system anywhere in the world that has never just 15 been able to use an alignment guide to -- to capture an image of a check sufficient for deposit. And we're not aware of any 16 17 system commercially that actually uses an alignment guide as 18 one of its elements for that purposes. They use the criteria that are listed at column three, lines 53 to 54, lines 11. But what I think petitioner

- 19
- 20
- [inaudible] --21
- 22 JUDGE HOWARD: I'm sorry. I'm very confused. So this
- 23 is not on the patent that we're discussing today, the '571
- 24 patent?
- 25 MR. SHEASBY: I'm sorry. What is this, Your Honor?
- 26 JUDGE HOWARD: These arguments, were these made

Case: 23-2124 Document: 32-1 Page: 495 Filed: 03/11/2024

- 1 regarding the '571 patent? Or are these something else
- 2 that were totally being drawn off something that's completely
- 3 off what we need to deal with?
- 4 MR. SHEASBY: These arguments were on the '571
- 5 patent, Your Honor.
- 6 JUDGE HOWARD: Okay. And the District Court found
- 7 that the 571 rejected this motion?
- 8 MR. SHEASBY: The dis- -- the District Court did
- 9 deny -- did deny the motion, Your Honor.
- JUDGE HOWARD: And the '571 patent went to trial?
- 11 MR. SHEASBY: It did, Your Honor.
- 12 JUDGE HOWARD: And was the issue of enablement raised
- 13 at trial?
- MR. SHEASBY: It was, Your Honor.
- JUDGE HOWARD: And the jury found that the claims
- were enabled?
- MR. SHEASBY: The jury did find that the claims
- 18 were enabled. And the --
- 19 JUDGE HOWARD: So -- so what you're asking us to do
- 20 is you want us to say that patent owner is stuck with an
- 21 argument they made that was rejected by the District Court,
- because you asked the District Court to reject it, and was
- rejected by the jury because you asked the jury to reject it.
- Is that what I understand you're trying to do?
- MR. SHEASBY: I think what I'm asking Your Honors
- 26 to do is that if an -- a witness who's paid by PNC reports a

- 1 fact under oath, that that fact has -- has weight and it
- 2 should be --
- 3 JUDGE HOWARD: And did you have witnesses that go and
- 4 say that the claims were enabled?
- 5 MR. SHEASBY: Yes, Your Honor. We did.
- 6 JUDGE HOWARD: And you paid them?
- 7 MR. SHEASBY: Yes, Your Honor.
- 8 JUDGE HOWARD: And we should give those -- that
- 9 testimony equal weight?
- MR. SHEASBY: Sure. And -- and if there was
- 11 testimo- -- you should absolutely do so, Your Honor. And if
- 12 there was testimony that was inconsistent with the position
- we're taking now, you could be assured that it would be
- 14 presented to Your Honors.
- JUDGE HOWARD: Or someone recognized that testimony
- 16 from witnesses who aren't actually testifying in this
- 17 proceeding is somewhat irrelevant.
- MR. SHEASBY: I -- I understand Your Honor's
- 19 position. And so if you go to slide 41, you'll see that the
- 20 testimony that the specification speaks not just about any
- 21 alignment guide. And if you go to line 7, lines 45 through 57
- in particular, which is the second column on slide 41, it
- 23 speaks not just about any alignment guide that can be used,
- 24 it actually speaks about a combination of alignment guide,
- edge detection, and corner detection, the combination of
- 26 which can result in insufficiency.

- 1 And I point this out not because the specification
- 2 is what's the purpose of -- of defining obviousness. I point
- 3 it out because there is no evidence in the record that that
- 4 combination that we specified there, which speaks to
- 5 alignment -- alignment, edge detection, and corner detection,
- 6 being combined together, and at the end speaking about using
- 7 corner detection as -- as -- as a monitoring criteria.
- 8 There's no evidence that that actually was applied
- 9 successfully in the art to achieve an image that was
- 10 sufficient for deposit.
- JUDGE DIRBA: Mr. Sheasby, this is Judge Dirba. I
- 12 have a question to make sure that I'm understanding your
- argument. And I'm specifically looking at the '779 patent. Is
- 14 it your contention that the claim requires the alignment
- guide to be used, and the only thing used to capture a check,
- and the check must actually be deposited in order to meet the
- 17 limitations of claim one.
- MR. SHEASBY: No. So it's a comprising claim. So
- 19 the image must be sufficient to deposit. It can use the -- it
- 20 must use the alignment guide. It can use things in addition
- 21 to the alignment guide.
- JUDGE DIRBA: Okay. And the -- the check actually
- 23 needs to be deposited at the end of the day; is that correct?
- MR. SHEASBY: No. So the -- the image just needs
- 25 sufficient -- there may be other reasons why it fails. But
- 26 the image needs to be sufficient.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PNC BANK N.A., Petitioner,

v.

UNITED SERVICES AUTOMOBILE ASSOCIATION, Patent Owner.

Case IPR2021-01073 U.S. Patent No. 8,977,571

PATENT OWNER USAA'S NOTICE OF APPEAL

Case IPR2021-01073 U.S. Patent No. 8,977,571

Pursuant to 35 U.S.C. §§ 141, 142, and 319, and in accordance with 37 C.F.R. §§ 90.2-90.3, Patent Owner United Services Automobile Association ("USAA") appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision of the Patent Trial and Appeal Board ("Board") entered on January 19, 2023 in IPR2021-01073 (Paper No. 72) ("Final Written Decision"), attached as Exhibit A, and from all underlying findings, determinations, rulings, opinions, orders, and decisions regarding the *inter partes* review (Case IPR2021-01073) of U.S. Patent No. 8,977,571 (the "'571 Patent").

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), USAA states that the issues on appeal include, but are not limited to: the Board's determination that Claims 1-6, 9, 10, 12, and 13 of the '571 Patent have been shown by a preponderance of the evidence to be unpatentable; the Board's denial of Patent Owner's motion to submit supplemental information; the Board's denial of Patent Owner's motion to exclude; the Board's construction of the challenged claims and application of its construction of the claims to the facts of record; the Board's procedural rulings, including its rulings regarding the adequate and timely preservation of certain of the parties' arguments; the adequacy of the Board's consideration of the expert testimony, prior art, and other evidence in the record, including, but not limited to, evidence and testimony from related district court proceedings between Petitioner and Patent Owner; the Board's factual findings, conclusions of law, or other determinations

Case: 23-2124 Document: 32-1 Page: 500 Filed: 03/11/2024

Case IPR2021-01073

U.S. Patent No. 8,977,571

supporting or related to those issues (such as motivation to combine or reasonable

expectation of success); the adequacy of the Board's consideration of prior IPR

proceedings concerning the challenged claims, including the Board's prior Final

Written Decision finding the challenged claims not unpatentable based on the same

or similar prior art and the same or similar arguments and evidence; the Board's

application of its policies and procedures; the Board's compliance with the

Administrative Procedure Act, including whether the Final Written Decision is

arbitrary, capricious, an abuse of discretion, not in accordance with law, or in excess

of the Board's jurisdiction, and any procedural irregularities associated with the

review proceeding; as well as all other issues decided adversely to USAA in any

orders, decisions, rulings, and opinions.

This Notice of Appeal is being e-filed with the Clerk's Office for the United

States Court of Appeals for the Federal Circuit, along with payment of the required

docketing fees. In addition, a copy of this Notice of Appeal is being filed

simultaneously with the Patent Trial and Appeal Board and with the Director of the

United States Patent and Trademark Office.

Respectfully submitted,

Dated: June 30, 2023

/Anthony Q. Rowles/

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- 2 -

Appx1490

Case IPR2021-01073 U.S. Patent No. 8,977,571

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> Case IPR2021-01073 U.S. Patent No. 8,977,571

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6, the undersigned certifies that on June 30, 2023 a copy of the foregoing **PATENT OWNER'S NOTICE OF APPEAL** was served by electronic mail, as agreed to by the parties, upon the following:

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I also certify that in addition to being filed electronically with the Board, a copy of this Notice of Appeal was deposited with Priority Mail Express on June 30, 2023 for delivery to the Director of the United States Patent and Trademark Office at the following address:

Case IPR2021-01073 U.S. Patent No. 8,977,571

Director of the United States Patent and Trademark Office c/o Office of the General Counsel Mail Stop 8
P.O. Box 1450
Alexandria, VA 22313-1450

I further certify that a copy of the foregoing Notice of Appeal is being filed via CM/ECF on June 30, 2023 with the United States Court of Appeals for the Federal Circuit.

/Susan M. Langworthy/ Susan M. Langworthy